SOCHIAS
sociedad chilena de astronomía

XIV Annual SOCHIAS Meeting
Marbella, January 23-26, 2017

Abstracts - Oral contributions (Alphabetical by Author)

A

Alex Alarcón

"The formation of dwarf Spheroidal galaxies including their star formation histories"

Abstract:
Dwarf spheroidal (dSph) galaxies are regarded as key object in the formation of larger galaxies and are believed to be the most dark matter dominated systems known. There are several model that attempt to explain their formation, but they have problems to model the formation of isolated Dsph. Here we will explain a possible formation scenario in which star clusters form in the dark matter halo of a dSph. these cluster suffer from low star formation efficiency and dissolve while orbiting inside the halo. Thereby they build the faint luminous components that we observe in dSph galaxies. In this project we add different star formation histories to the simulations to compare the results with previous works and observational data.

Alba Aller Egea

"A third guest in the central star of the planetary nebula LoTr5"

Abstract:
LoTr5 is a planetary nebula with an unusual binary central star. The pair consists of a rapidly rotating subgiant G star and a hot star (probably sdO or white dwarf), which is responsible for the ionization of the nebula. Both components are (thought to be) in a wide orbit with a period of about 2000 days, derived from recently published radial velocity observations. We present our new results of this object, in which we see radial velocity variations with period of a few days, that may indicate the presence of a third close companion. Besides, the spectra show a complex double-peak Halpha profile which varies with very short time scales. This could be due to either chromospheric activity or the presence of an accretion disk. I will present our current knowledge of this interesting object based on new observations and how they help us to unveil the architecture of this system.

Javier Alonso-García

"Globular clusters in the inner Milky Way"

Abstract:
Although most globular clusters in the Milky Way are interior to the solar circle, the globular clusters located towards the inner Galaxy have been historically neglected due to the limitations imposed in their study by the existence of large extinctions in their lines of sight. In my talk I will present a series of different novel approaches that we are implementing to extract the relevant information about the physical parameters of these objects, using information provided by on-going and future astronomical surveys. I will also show interesting by-products of these analyses that can allow us to better understand the characteristics of the interstellar medium in the low-latitude lines of sight towards these clusters.

Morten Andersen

"The stellar content and dynamical state of Westerlund 1, the most massive young star cluster known in the Galaxy"

Abstract:
Most if not all stars and in particular massive stars are born in clusters and clustered environments. Super-massive star clusters are of particular interest due to their richness in massive stars that may influence the formation of low-mass stars in their vicinity compared to star formation in sparse regions. This would be evident in the full initial mass function of the cluster Further, they are the binding link between nearby lower-mass star clusters with few massive stars to the extra-galactic starburst environments rich in O and B stars.
Only in the few known Galactic examples can the full stellar content be observed through direct star counts instead of relying on integrated properties.

We present deep HST and Gemini/GeMS near-infrared imaging of Westerlund 1 in order to determine the stellar content down to 0.15 solar mass. We discuss the derived mass function for the cluster and compare it both to the field and low-mass embedded clusters.
The derived initial mass function is compared with the initial mass functions determined locally in the field, in nearby lower mass regions as well as extra-galactic measurements.
We discuss the dynamical state of Westerlund 1 and the implications for its chances of survival to old age.
Further we discuss evidence that Westerlund 1 is not formed in isolation but other star formation is ongoing nearby.

JosephAnderson

"Type II supernovae: the most abundant stellar explosion in the Universe"

Abstract:
Type II supernovae (SNeII) are believed to arise from massive red supergiant stars that explode with a significant fraction of their hydrogen-rich envelopes intact. They are the most abundant

SN type and are thus important in our understanding of massive star evolution, together with chemical enrichment and galaxy dynamics. In addition, SNeII can be used as astrophysical probes.
Here, I will give an overview of our understanding of SNeII and their progenitors.
I will concentrate on trying to map SNII transient diversity to differences in their pre-SN properties such as ejecta mass, progenitor radius, and initial progenitor metallicity, summarising the progress that has been made in this field in the last decade.
Finally, I will discuss two specific recent results. Firstly, I will argue that
the early-time light-curves of SNeII require significant circumstellar interaction with dense material close to the progenitor. This implies that the majority of SNII
progenitors are suffering very strong mass-loss close in time to explosion. Secondly, I will discuss the use of SNeII as astrophysical probes, and in particular
the possibility of measuring extra-galactic environment metallicity through SNII observations.

Manuel Aravena

“ASPECS: The ALMA Spectroscopic Survey of the Hubble Ultra Deep Field”

Abstract:
This is an invited talk. I will present an overview and the main results of ASPECS: the ALMA Spectroscopic Survey in the Hubble Ultra Deep Field (UDF). The goal of this survey is to obtain an ultra-deep, unbiased census of the molecular gas and dust continuum emission in high redshift galaxies (z = 0–8). Our pilot survey covers a 1 arcmin^2 region of the Hubble UDF, and provides full redshift coverage for CO and [CII] line emission by performing frequency scans of the ALMA bands 3 and 6. Our observations are amongst the deepest ever performed in such a contiguous area, reaching down to ~13 micro-Jy in the 1.2-mm continuum maps. In this talk, I will highlight the main results from our pilot survey, preliminary images from our cycle-3 ultra deep 1-mm data and and I will show expectations from our recently approved ALMA large program.

IgnacioAraya

“Stellar and wind parameters of massive stars from spectral analysis”

Abstract:
The only way to deduce information from stars is to decode the radiation it emits in an appropriate way. Spectroscopy can solve this and derive many properties of stars. In this work we seek to derive simultaneously the stellar and wind characteristics of A and B supergiant stars. Our stellar properties encompass the effective temperature, the surface gravity, the stellar radius, the micro-turbulence velocity, the rotational velocity and,
finally, the chemical composition. For wind properties we consider the mass-loss rate, the terminal velocity and the line--force parameters (α, k and δ) obtained from the standard line--driven wind theory.
To model the data we use the radiative transport code \textsc{Fastwind} considering the newest hydrodynamical solutions derived with \textsc{Hydwind} code, which needs stellar and line--force parameters to obtain a wind solution.

A grid of spectral models of massive stars is created and together with the observed spectra their physical properties are determined through spectral line fittings.
These fittings provide an estimation about the line--force parameters, whose theoretical calculations are extremely complex. Furthermore, we expect to confirm that the hydrodynamical solutions obtained with a value of δ slightly larger than ~0.25, called δ-slow solutions, describe quite reliable the radiation line-driven winds of A and late B supergiant stars and at the same time explain disagreements between observational data and theoretical models for the Wind--Momentum Luminosity Relationship (WLR)."

Javier Arenas

"Can rotation fracture the neutron star crust?"

Abstract:
Pulsars present precisely periodic pulses measured in their flux energy over time, from which the angular frequency can be obtained, so they are thought to be rotating neutron stars with a strong dipolar magnetic field. The pulses slow down progressively, due to the loss of rotational energy. In addition, there are timing irregularities, the most prominent of which are "glitches", sudden spin-up events, in which about 1% of the spin-down is "recovered". There are two main mechanisms discussed in the scientific literature to explain this kind of events. The first is the sudden transfer of angular momentum from the superfluid (or part of it) to the solid crust of the star. The second is a "starquake", a sudden breaking of the solid crust due to stress accumulated by the spin-down of the star. Our object of study is the second of these mechanisms, which was previously studied by Baym & Pines (1969). They showed that, for the Crab pulsar, starquakes due to spin down cannot explain the relatively short recurrence times (of few years), instead requiring hundreds of years between glitches. For the large glitches of the Vela pulsar the scenario is even worse. However, the size distribution of glitches is bimodal, so one might still try to explain the smaller glitches through this mechanism. In this investigation, we demonstrate that the deformation by rotation is not big enough to explain glitch activity, even of small glitches. In addition, we analyze the failure criteria in order to constrain the angular frequency necessary to produce the starquakes, and if it happens, we estimate how much energy it will release.

Maria Argudo-Fernández
"SFH of MaNGA galaxies with CIGALE"

Abstract:
To elucidate how galaxies grow with time, one needs to recover the star formation history (SFH), both in space and time, for individual galaxies. How exactly do galaxies build their disk when they grow in isolation, unaffected by external influences? We aim of characterizing the SFH of isolated galaxies using CIGALE, a state–of–the–art SED modelling code, including the contributions from stellar populations of all ages, thermal and non–thermal gas emission, dust (both in absorption and emission), and optionally an active nucleus. This resource allows us to get a better handle on the continuum attenuation and breaks more reliably the age–attenuation degeneracy, among other things. We present here the latest results on using CIGALE models to

constraint the SFH of spiral isolated galaxies observed by MaNGA, which will be presented in a paper in preparation.

B

Loreto Barcos-Muñoz
“ALMA’s View of the Arp 220 Disks From New Extended Configuration Observations of Dense Gas Tracers”

Abstract:
We present new continuum and line observations of the proto-typical (and closest) ULIRG, Arp 220. Physically, Arp 220 is often invoked as the most extreme local star-forming system and often used as a template for starbursts at high redshift. It is evident that understanding its ISM conditions is crucial for star formation and galaxy evolution. Using the most extended configuration available at Cycle 3, we achieve resolution of 0.08" = 30 pc targeting the mm-wave continuum and the high critical density tracers HCN, HCO+, their isotopologues, and the shock tracer SiO. This resolution is sufficient to resolve both disks and ideal to compare to our 33 GHz VLA continuum images at the same resolution (Barcos-Muñoz et al. 2015). We combine the two data sets to construct resolved spectral energy distributions maps of the two nuclear disks hosting the main activity in the galaxy. From their SED, the two nuclei show distinct behaviors, with the west showing a rising spectral index through the ~90 GHz regime, indicative of opaque free-free or dust emission. The eastern nucleus shows a flatter spectrum implying thermal emission is still an important component at this high frequencies. Using the line emission, which traces the high density gas pervasive in the system, we present gas and kinematic profiles for both disks. For the well-resolved eastern nucleus, we use these data to compare the structure of the disk to predictions for models of self-regulated star formation (including the Eddington limited model of Thompson et al. 2005), which pivot on knowing the disk mass, gas mass fraction, and local velocity dispersion, all available in a resolved way for the first time from ALMA. Finally, we present the integrated 8 GHz-wide mm-wave spectrum of each nucleus near 90 GHz, highlighting potential differences in the ISM conditions between the two and shedding light on the nature of their powering source.

Daniela Barría

”Photometric study of shock excited regions at multiple shell planetary nebulae”

Abstract:
Multiple shell planetary nebulae (MSPNe) are known to show one or more additional faint outer shells/haloes surrounding the main central nebula. They are the end product of hydrodynamic and radiative processes taking place during the multiple episodes of mass-loss at the AGB and post-AGB phases.
As radiative transfer hydrodynamic models have shown, shock fronts may occur at certain stages of the evolution affecting the energy balance of the PNe. We have analyzed HST images in a sample of old PNe to investigated the occurrence of shocks. To identify shock excited regions two independent methods have been used: a 2D analysis of the line ratios log(Halpha/[NII]) vs log (Halpha/[SII]) and the [OIII]/Halpha line ratio.

These results will help us to constrain for physical properties to be used in a further modeling of PNe by means of CLOUDY photoionization code.

Amelia Bayo
"Introducing the Chilean Virtual Observatory (ChiVO): an update of its capabilities"

Abstract:
The Virtual Observatory is a framework that seeks to ease data discovery and publication in astronomy (among other goals). Operating on top of a series of standards, tools developed by local branches of this initiative (i.e. ChiVO, the SVO, etc.), offer the user data access and analysis in an optimized. In this talk we will present the current capabilities of ChiVO, including a life demo of the cloud services that will be available to the Chilean astronomical community in the near future.

Juan Carlos Beamín

"Search and characterization of ultra cool dwarfs from the VVV survey"

Abstract:
Ultra cool dwarfs compose the lowest mass end of the stellar mass function.
In the last 10 years large efforts have been made to complete the census in the solar neighborhood, but it still not complete, particularly for the faintest members and towards the most crowded areas in the sky.
Using near IR multiepoch observations from the VVV survey we obtained precise proper motion and parallaxes for thousands of sources and selected UCD candidates to understand better their true abundance and physical properties.
We performed spectroscopic follow up preferentially in the NIR to obtain accurate spectral types and search for signatures of youth or high gravities (old/halo objects). Here we present the results obtained so far by this project.
Including over 35 new UCD with accurate proper motions, parallaxes, spectral types and Radial velocities in some cases.
I will discuss new limits on the presence of distant brown dwarfs and high mass planets around our closest neighbour system Alpha Centauri, and also the impact on this research area that can be made with the new VVVX survey in the following 3 years."

Patricia Bessiere

"Characterising the host galaxies of type II quasars"

Abstract:
Although there is a growing acceptance that active galactic nuclei (AGN) play an important role in the evolution of galaxies, the means by which they are triggered is still a matter of hot debate. In terms of the most luminous AGN (quasars), it has been suggested that they are triggered in major, gas-rich mergers. If this is the case, then we would expect to find clear evidence of these

mergers in the form of morphological disturbance of the quasar host galaxies. However, tidal features will not be the only consequence of such mergers. It is predicted that they will also be accompanied by a prodigious burst of star formation. I will present both optical imaging and spectroscopic observations, aimed at exploring these prediction, which suggest that this merger induced scenario is indeed plausible.

Guillermo Blanc

"A Transition Mass Scale in the Galaxy Mass-Metallicity Relation"

Abstract:
I will discuss the results of re-measuring the mass-metallicity relation (MZR) of local star forming galaxies using IZI, a recently developed Bayesian code that measures the physical properties of ionized nebulae using photo-ionization models. I will make the argument for the existence of a characteristic transition mass sale in the MZR at which star forming galaxies suffer a significant enhancement in their level of chemical enrichment. Using simple chemical evolution models that include the flow of baryons in and out of galaxies I will show how the MZR can be used to constrain the efficiency of star formation, the magnitude of gas outflows, and the physics of gas accretion into dark matter halos.

Michael Blanton

"The Sloan Digital Sky Survey and APOGEE-2"

Abstract:
The Sloan Digital Sky Survey IV is mapping the Universe on the largest scales, creating the largest integral field spectroscopy survey of galaxies, and mapping all components of the Milky Way with high resolution spectroscopy of stars. I will describe the program, with a special focus on the new southern hemisphere component starting in 2017 at Las Campanas Observatory to map the center of the Milky Way.

Madelon Bours

"HW Vir: a direct detection of the seconday star"

Abstract:
HW Virginis is an eclipsing binary, consisting of a hot subdwarf-B star primary and an M-dwarf secondary star in a 2.8 h orbit. The hot sdB star strongly irradiates the facing hemisphere of the M-dwarf, which is otherwise invisible. Indirect evidence suggests that this binary is hosting two Jovian circumbinary exoplanets, which is one of the reasons it has been studied extensively. However, because the M-dwarf has never been clearly detected spectroscopically, it has not been possible to determine accurate stellar masses, something that is crucial to investigate the planetary hypothesis. Here we present the first direct detection of the secondary star, in phase-resolved spectroscopic VLT + X-shooter data. These data contain both absorption and emission features from the low-mass secondary star, all originating in the inflated, irradiated hemisphere.

For the first time we are able to characterise this binary and its stars, but are the results as everyone always expected?

Konstantina Boutsia

“Instrumentation at the Magellan Telescopes”

Abstract:
The twin 6.5-meter Magellan telescopes are located at Las Campanas Observatory and have been operational since 2002. Current operations include a suite of 6 facility instruments and 5 PI instruments, having dedicated observing campaigns. We will present characteristics and performance of all instrumentation available to the chilean astronomical community. This includes optical and infrared spectrographs of high and moderate resolution as well as optical and infrared imagers. We will discuss existing pipelines for reducing Magellan data and introduce a specific observing mode, designed to minimise slit losses in spectroscopy.

Rafael Brahm

“K2 Planets from Chile”

Abstract:
Transiting planets offer the unique opportunity of determining the masses and radii for these objects. In addition, detailed follow up observations can be performed on them to further characterise their atmospheric structure and to refine their orbital parameters. All of this information is fundamental for constraining theories of formation structure and evolution of planetary systems. We started a project less than 1 year ago, among researchers working in four different Chilean institutions, with the goal of discovering bright transiting systems by using data from the Kepler K2 mission and ground-based instrumentation installed in Chile. In this short period of time we have already announced the discovery of 4 interesting systems while several other candidates are being followed up. These discoveries have proven that our team can be highly competitive in the quest of discovering new bright transiting systems. The experience gained with this ongoing project will be key for taking full advantage of the data that will come from the next space-based transiting mission: TESS.

Johannes Buchner

“NWAY - the fast and versatile cross-matching algorithm”

Abstract:
The increasing number of surveys available at any wavelength allows the construction of SEDs for any kind of astrophysical object. However, (1) different surveys/instruments, in particular at X-ray, UV and MIR wavelength, have different positional accuracy and resolution and (2) the surveys depth do not match each other and depending on redshift and SED, a given source might or might not be detected at a certain wavelength. All this makes matching of sources across catalogs non-trivial, specially in crowded fields. To overcome these issues, I present a

new algorithm: NWAY use state-of-the-art statistical methods for cross-matching an arbitrary number of catalogues. The user can also provide prior knowledge about color/magnitude distributions. We demonstrate that the commonly used Likelihood Ratio technique is outperformed in reliability and speed by NWAY. In this talk I will introduce the code and how it has been used for finding the ALLWISE counterparts to the X-ray ROSAT All-sky survey.

C

Claudio Caceres

"Towards an evolutionary sequence in young planetary mass companions"

Abstract:
In recent years a small number of planetary mass companions candidates (PMCs) at large orbital distances from their host stars has been identified. Their formation mechanism remains unknown, but studying the PMCs that are still in formation is providing some vital clues. In this talk I review the general properties of these PMCs, show recent results based on mm interferometric observations, and explain how these objects can be used to probe the early stages in the planet formation evolution.

Graeme Candlish

"Cosmological models beyond LCDM"

Abstract:
The standard model of cosmology, referred to as Lambda CDM, is strongly supported by various lines of observational evidence. Unfortunately there remain major puzzles associated with this model, as the nature of the dark sector (cold dark matter and dark energy) is still mysterious. It is therefore of interest to explore alternative models. In this talk I will give a general overview of this area, paying particular attention to the possible observational signatures of these models. I will also discuss the use of cosmological simulations to provide further tests of these novel ideas.

Francisco Castillo A.

"Magnetic field evolution in neutron stars: the effect of ambipolar diffusion"

Abstract:
Neutron stars contain the strongest magnetic fields known in the Universe. Using numerical simulations restricted to axially symmetric geometry, we study the long-term evolution of the magnetic field in the interior of an isolated neutron star under the effect of ambipolar diffusion, i.e. the drift of the magnetic field and the charged particles relative to the neutrons, driven by the Lorentz force and controlled by frictional forces and pressure gradients. We show that, in the restricted case of pure ambipolar diffusion, the magnetic field evolves towards a stable equilibrium configurations where the magnetic force is balanced by the degeneracy pressure

gradient. Hence, the system reaches a state that effectively suppresses the ambipolar diffusion within the timescales analytically expected, leading the magnetic field to configurations in which the poloidal magnetic field extends throughout the entire star and to the exterior, while the toroidal field is confined to torus shaped regions inside the star.

Pierluigi Cerulo

"Observing the Transformation of Galaxies in Distant Clusters"

Abstract:
Clusters of galaxies are the most massive virialised cosmic structures. They host a diversity of environments, from the dense cores to the sparse outskirts, providing observational laboratories for testing the theories of galaxy interactions. Clusters are characterised by a prominent red sequence and an over-abundance of early-type galaxies with respect to the field, indicating that their galaxy members undergo fast transformations from blue, star-forming and spiral-like to red, quiescent and bulge-dominated. I present the results from the study of a sample of 9 clusters at $0.8 < z < 1.5$ from the HAWK-I Cluster Survey (HCS, Lidman et al. 2013). We find that the build-up of the red sequence is accelerated in clusters with respect to the field, suggesting that the mass of the host dark matter halo is a crucial parameter in setting the timescales for star formation quenching. Our studies of the galaxy population along the red sequence show that this has transformed significantly in the last 8 Gyr, becoming richer in lenticular galaxies towards low stellar masses. I discuss the implications of our findings in the general context of galaxy evolution theories and give an overview of the current and ongoing work in the HCS.

Luis Chavarría

"Challenges for the Astronomy Program at CONICYT"

Abstract:
I will present some of the Astronomy Program progresses during the last few months as well as forthcoming challenges like the Atacama Astronomical Park and prospects for a chilean ALMA support center.

Lucas Cieza
"Imaging the water snow-line during a protostellar outburst"

Abstract:
Stars are believed to acquire most of their mass during short periods of intense disk accretion, known as FU Ori outbursts. During these events, accretion rates can reach up to 1E-4 Msolar/yr while source luminosities can easily exceed 100 L_solar for solar-mass stars. However, the effects of these extreme accretion episodes on the outer disk remain largely unknown. I will discuss the first direct image of the water snow-line in a protoplanetary disk, the location of which is critically important for disk evolution and planet formation theory. We show that the water snow-line, typically at 5 au in solar-type stars, can be moved out to ~40 au during enhanced accretion events. Our ALMA 230 GHz images at 0.03 arcsec (12 au) resolution of the

V883 Ori disk during an FU Ori-like outburst reveals a sharp intensity discontinuity at ~42 au, where the disk temperature reaches the sublimation point of water. The spectral behavior across the observed snow-line is in very good agreement with recent model predictions, suggesting an efficient fragmentation of silicate grains inside the water snow-line and a rapid growth of ice-covered grains outside this line. Since most planetary systems are expected to experience protostellar accretion outburst during formation, our results imply that highly dynamical snow-lines must be considered by disk evolution and planet formation models.

D

Mekhi Dhesi

"Twinkle Space Mission for Exoplanet Spectroscopy"

Abstract:
Twinkle is a space mission designed for visible and near-IR spectroscopic observations of extrasolar planets. Twinkle's highly stable instrument will allow the photometric and spectroscopic observation of a wide range of planetary classes around different types of stars, with a focus on bright sources close to the ecliptic. The planets will be observed through transit and eclipse photometry and spectroscopy, as well as phase curves, eclipse mapping and multiple narrow-band time-series. The targets observed by Twinkle will be composed of known exoplanets mainly discovered by existing and upcoming ground surveys in our galaxy and will also feature new discoveries by space observatories (K2, GAIA, Cheops, TESS).
Twinkle is a small satellite with a payload designed to perform high-quality astrophysical observations while adapting to the design of an existing Low Earth Orbit commercial satellite platform. The SSTL-300 bus, to be launched into a low-Earth sun-synchronous polar orbit by 2019, will carry a half-meter class telescope with two instruments (visible and near-IR spectrographs - between 0.4 and 4.5μm - with resolving power R~300 at the lower end of the wavelength scale) using mostly flight proven spacecraft systems designed by Surrey Satellite Technology Ltd and a combination of high TRL instrumentation and a few lower TRL elements built by a consortium of UK institutes. The Twinkle design will enable the observation of the chemical composition and weather of at least 100 exoplanets in the Milky Way, including super-Earths (rocky planets 1-10 times the mass of Earth), Neptunes, sub-Neptunes and gas giants like Jupiter. It will also allow the follow-up photometric observations of 1000+ exoplanets in the visible and infrared, as well as observations of Solar system objects, bright stars and disks.

Bruno Dias

"GOTHAM survey: the chemistry of Milky Way globular clusters is not what we thought"

Abstract:
Milky Way globular clusters are excellent laboratories for stellar population detailed analysis that can be applied to extragalactic environments. We use our GIObular clusTer Homogeneous Abundance Measurement (GOTHAM) survey to show how much the chemical abundances of globular clusters differ from those found in field stars, open clusters, and extragalactic star clusters (Dias et al. 2015, 2016). In particular we show how [alpha/Fe] affects the calibration of calcium triplet to metallicity depending on the chemical evolution history of the host galaxy

(Saviane et al. 2012, Vasquez et al. in prep.). We conclude that there is no universal calibration of calcium triplet index. We apply full spectrum fitting technique using synthetic and empirical stellar spectral libraries. This method is intrinsically reddening-free and efficient even for faint stars and low-resolution spectroscopy to derive radial velocity, Teff, log(g), [Fe/H], [Mg/Fe], [alpha/Fe]. We reached an agreement of [Fe/H] with high-resolution spectroscopic results of 0.08 dex (Dias et al. 2015, 2016) with an improvement for the metal-rich regime, which makes our results a new metallicity scale for Galactic globular clusters. This technique is perfectly suitable to observe extragalactic globular cluster stars with the advent of the 40m-class telescopes like the E-ELT.

Sonia Duffau

"Characterizing the chemistry of the old Milky Way Bulge population by means of RR Lyrae stars"

Abstract:
We present a study of the detailed chemical composition of the old Bulge population, using RR Lyrae (RRL) stars as its tracers. Giraffe HR10 high resolution spectra were obtained for 35 RRL at random pulsational phases, and then coadded to increase S/N. Since RRL atmospheric parameters (most relevantly Teff) vary with phase, the feasibility of coadding was verified by developing a tool to simulate the coaddition of spectra by means of synthetic spectra, and estimate the optimal effective temperature to assign to the coadded for analysis. It was verified that a simple average of the temperatures of the input spectra is adequate to recover the input chemical composition. For the observed spectra, effective temperatures for the coadd are estimated from a new photometric temperature calibration, which considers both the phase and the periods of the stars under analysis. The chemical analysis was performed by means of the automated code MyGISFOS, and abundances were derived for Carbon, alpha elements, the proton-capture element Scandium, Fe and Fe peak elements, and the n-capture element Yttrium. We report our results here, in particular we will show the difference found between spectroscopic and photometric estimates of the metallicity, and the general behaviour of the alpha-elements measured for the sample.

E

Néstor Espinoza

"Unveiling exoplanet atmospheres with the ACCESS survey"

Abstract:
One of the most exciting possibilities enabled by transiting exoplanets is to measure their atmospheric properties through the technique of transmission spectroscopy. The optical window, in particular, is rich in atmospheric information and is capable of disentangling several degeneracies in atmospheric modelling which are key in order to get a complete picture of an exoplanet atmosphere. Motivated by this, the Arizona-CfA-Católica Exoplanet Spectroscopy Survey (ACCESS) aims at studying the atmospheres of ~20 exoplanets with different sizes and temperatures in the entire optical atmospheric window using ground-based facilities. In this talk,

I will present the survey, its first results and future prospects in the era of space missions such as TESS and JWST.

Néstor Espinoza

“Connecting atmospheric composition with planet formation: C/O ratios and beyond”

Abstract:
The detection of important molecules such as water in planetary atmospheres of giant exoplanets has allowed us to put constrains in the bulk composition of planetary envelopes which were once accreted in protoplanetary disks. This, in turn, is defined by the availability of the different elements both in the form of solids and gas in the disk, which vary both in space and time due to the different condensation fronts of the accreted elements. Could we, then, constrain the possible formation paths of those planets and/or predict the composition of planetary envelopes to be observed with present and future instruments? In this work I will present recent work on this topic which considers simple models in order to make (1) predictions for the C/O ratios of planetary envelopes in the context of the core-accretion theory of planet formation and (2) predictions for ratios of other important observables in planetary atmospheres such as Na, K, Ti, V and Fe in the context of "in-situ formation" of giant exoplanets.

F

MICHAEL FELLHAUER

“How to make dSph galaxies?”

Abstract:
I will review our formation model of dSph galaxies and inform about our latest results regarding angular momentum, i.e. rotation, and star formation histories, which are now included in our numerical simulations.

Veronica Firpo

“Violent star formation in galaxy interactions”

Abstract:
The most violent processes of star formation can be found in interacting galaxies, where gas compression can trigger the formation of giant star-forming regions. Using high-resolution spectroscopic information from MIKE/Magellan we studied the internal kinematics of a sample of star-forming regions located in three strongly interacting galaxies. A detailed study of the ionized gaseous component in these regions reveal a complex internal kinematic, which can be identified by asymmetric line profiles and multiple components. The kinematic information suggests that these star-forming objects corresponds to giant complexes.

Laura Flores Palma

“Geological and thermal analysis of volcanic-magmatic structure in Parga Chasma, Venus”

Abstract:
Venus plays a fundamental role in understanding the evolution of the terrestrial planets, and after the Earth, it is one of the best-characterized planets, although fundamental questions like atmosphere escape, geological evolution and volcanic activity are poorly understood . The study of these subjects is the principal motivation for the European Space Agency (ESA), and was the main objective of Venus Express mission, which specific goals included the measurement of surface emissivity, given that this parameter is key for the understanding of volcanism on Venus and the improving of the acquisition of images in some areas poorly observed by the Magellan mission using the Visual InfraRed Spectral and Thermal Spectrometer (VIRTIS) on board of Venus Express, thus achieving the correlation between the altimetry and the variation in surface brightness.
The Magellan images and altimetry data show that the surface of Venus is dominated by a mosaic of obviously volcanic plains that cover about 70-80% of the surface. In addition to this, and thanks to the discovery of atmospheric windows, is possible to measure the surface radiation, with a low atmospheric intervention, using VIRTIS data base.
Parga Chasma is a long fracture system in the southern hemisphere of Venus. This is one of the principal branches of the BAT (Beta-Atlas-Themis regions) zone that have been interpreted to be hot spots. The result of this study is a map with geological information and surface temperature of the eastern part of Parga Chasma, next to Themis Regio. Recent studies based on VIRTIS, show possible volcanic activity in this region.

Camilo Fontecilla

“Second decoupling between SMBHB and its inner accretion disc”

Abstract:
The coalescence of two supermassive black holes (SMBHs) produces powerful gravitational-wave (GW) radiation and, if gas is present in the vicinity, also an electromagnetic (EM) counterpart. In the standard picture, an EM outburst will be produced when the binary ``decouples'' from the circum-binary disc and starts ``squeezing'' the disc inside the secondary orbit, resulting in its quick accretion on to the primary black hole. Here we use analytical arguments and numerical simulations to show that the disc within about $20~R_S$ of a SMBH survives the merger without being depleted. The reason is a ``second decoupling'': the inner disc thickens due to tidal heating and inefficient cooling, effectively decoupling from the interaction of the binary. We show that this second decoupling quenches the heating sources in the disc ${\cal O}(10^2)$ days before coalescence. This will render the peak UV/X-ray luminosity significantly weaker than previously thought. After the merger, the residual disc cools down and expands, merging with the outer disc rather than being completely accreted. This results in continuous EM emission, hindering the detection of the cut-off and re-brightening proposed in earlier studies.

G

Matías Gárate

“The effect of planetary feedback in the circumplanetary region.”

Abstract:
As planets accrete material from their protoplanetary disk, the gravitational energy of the accreted gas is released back as thermal energy in the circumplanetary region. Using hydrodynamical simulation we study how the luminosity and accretion of a Jupiter mass planet affects its surrounding gas. We find that the circumplanetary disk gets depleted because of the thermal pressure exerted by the planet, and that the gap is partially refilled due to the increase in the temperature and kinematic viscosity in the coorbital region.

Doug Geisler

“GeMS Observations of the Obscured Galactic Bulge Globular Cluster NGC 6624“

Abstract:
We will present results for the obscured Galactic globular cluster NGC 6624 lying in the bulge.
The observations were obtained exploiting the exceptional high-resolution capabilities of the near-IR camera GSAOI combined with the Gemini Multi-Conjugate Adaptive Optics System at the GEMINI South Telescope.
The images in the J and K bands are generally sub-0.1"", only slightly larger than the diffraction limit of the telescope, yielding the deepest and
most accurate color-magnitude diagram obtained so far from the ground for this or any other bulge cluster.
We investigated the structural and physical properties and age of NGC 6624,
supplementing the GEMS data with data from the Vista Variables in the Via Lactea project. The CMD reveals the second knee of the main
sequence and allows us to determine a very accurate age of 12.0 +-0.5 Gyr.

Roberto Gonzalez

“Parallel programming in the era of Big Data”

Abstract:
The explosive growth of data-sets from observational surveys and numerical simulations produce large amounts of data, in several cases processing such data is impossible using personal computers, and it is only possible with computer nodes or clusters where parallel programming knowledge is fundamental to take full advantage of their capabilities. I will review common parallel languages and schemes for shared and distributed memory systems, such as MPI, threads and CUDA."

DIAH Y.A. SETIA GUNAWAN

“ALMA Observation of Mass-Loss Rates From Massive Stars”

Abstract:
There are sufficient evidence that points to an over-estimation of the currently ac- cepted mass-loss rates from massive stars as shown by inconsistencies in results de- rived using different diagnostics, attributed to wind clumping. Potential downward revisions of mass-loss rates of massive stars have a profound effect on the stars’ evo- lution. In this talk we present the results of the ALMA continuum observations of a selection of massive stars. The ALMA bands provide the necessary sub-millimeter and millimeter information to constrain the density/clumping structure in the in- termediate wind zone, in which the wind is extremely sensitive to clumping. Our ultimate goal is to combine analysis of all diagnostics from the Far-UV to the radio domain with consistency, to derive the clumping properties throughout the entire wind and help to constrain the physical origin of wind clumping.

H

Massinissa Hadjara

“SCIROCCO: Simulation Code of Interferometric-observations for ROtators and CirCumstellar Objects”

Abstract:
SCIROCCO is a chromatic semi-analytical model, for high angular resolution observations, for a large panel of high actives stars: Simulation Code of Interferometric-observations for Rotators and CirCumstellar Objects (SCIROCCO). This code allows to computing monochromatic intensity maps of uniformly rotating, flattened, and gravity-darkened stars from a semi-analytical approach for the fast rotators.
I will quickly present some results of this last (fast rotators), which I obtained during my PhD thesis, for four massive stars of spectral types B, A and F, who have allowed me to characterize the mechanisms of stellar rotation.
These works has opened also some prospect for more systematic studies of similar objects, with extending to the relationship photosphere - circumstellar envelope, including the modeling of pulsations (radial and non radial), of a circumstellar envelopes and of polar jets ...etc.

Keywords : Stars : fast rotation, non-radial pulsation , circumstellar disk, Methods : observational, numerical Techniques : interferometric, high angular resolution.

Gergely Hajdu

“Cepheid variables in the VVV survey”

Abstract:
Classical Cepheid variables play a fundamental role in cosmology through the determination of distance to other galaxies, allowing calibration of the cosmic distance ladder. Within the Milky Way, known classical Cepheids, being relatively young stars, can be used to trace the position of the spiral arms in the vicinity of the Sun. Unfortunately, their position in the Galactic disk

results in most classical Cepheids having excessive amounts of reddening, which so far has prevented their discovery in the farthest regions of the Milky Way.
In recent years, the Vista Variables in the Via Lactea (VVV) project has completed a ~520 square degree YZJHKs multi-color, and Ks band multi-epoch survey of the southern Galactic disk and the Galactic bulge, utilizing the VIRCAM camera of the 4.1m VISTA telescope at Paranal Observatory. The greatly diminished extinction in the near-infrared bands enables the discovery of classical Cepheids as far as the far side of the Galactic disk.
We have started the VISTA Galactic Cepheid Program (VGCP) in order to find the so far uncovered Cepheid population of the Milky Way. This program has already resulted in the discovery of a twin Cepheid pair behind the Galactic bulge, indicative of a parent open cluster which is completely hidden by the high extinction in the plane.
Furthermore, we have discovered classical Cepheids in a thin disk within the volume of the Galactic bulge, a hitherto unknown stellar population in the Milky Way.
I present the current status of the VGCP and the follow-up observations that
have been initiated with the aim of characterizing the Cepheid variables of the VVV survey, and through them, the far disk of the Milky Way, as well.

Jinhua He

“Monitor millimeter line variation toward IRC +10216”

Abstract:
We monitored the temporal variation of selected millimeter maser lines around 1mm using AROSMT 10m telescope. Both line strength variation and line shape variation are found through a relative calibration procedure. I will report the light curves and their properties, discuss the possible physical origin of such relative variability in mm lines in the circumstellar envelops of evolved stars.

Jiasheng Huang

“Formation of Massive Galaxies through ULIRG phase at z=2”

Abstract:
We use the MIPS 24 micron band to select a sample of galaxies with strong PAH emission at z=1.9. The Herschel photometry of these galaxies show that they are unbiased against dust temperature and their IR luminosities are higher than 10^12 solar luminosity. This is a large ULIRG/SMG sample with known redshift distribution, which makes it possible, for the first time, to measure their two point correlation function, and their halo mass.

Tom Hughes

“Physical conditions of interstellar gas in star-forming galaxies at z<0.2”

Abstract:

We study the physical conditions in the interstellar gas of a sample of 27 main-sequence star-forming galaxies at 0.03<z<0.2 present in the Valparaíso ALMA Line Emission Survey (VALES). We use ALMA CO(1-0) line observations combined with Herschel [CII] spectroscopy and far-infrared photometry as diagnostics of the physical conditions of the gas in photodissociation regions. We determine the gas density, surface temperature, pressure, and the strength of the incident FUV radiation field, G, via a comparison of our observations to the predictions of a photodissociation region model. Compared to galaxy samples at different redshifts, our results indicate that the average strength of the FUV radiation field appears constant up to redshift z~6.4, yet the neutral gas density increases as a function of redshift by a factor of 100 that persists regardless of various adjustments to our observable quantities. This evolution could provide an explanation for the observed evolution of the star formation rate density with cosmic time, but several observational biases hinder a robust interpretation.

Pedro Humire

"About the kinematic and dynamic of the active galactic nucleus of ESO 362-G18"

Abstract:
It is widely accepted that the radiation emitted by an active galactic nucleus (AGN) is a result of accretion onto the central supermassive black hole (SMBH) of mass ~ 10^3-10^{10}. However, the exact nature of the mechanisms responsible of transferring mass from galactic scales (kiloparsecs) down to nuclear scales (parsecs and subparsecs) to feed the SMBH is still an open question. Potential effects (e.g. feedback) which in turn can cause the AGN in their host galaxy, could also be highly interesting.

The purpose of this work is to try to understand the kinematic and dynamic of nearby AGNs and then extrapolate this to more distant galaxies and to know more about the galactic evolution in general. I will present results on the kinematic and dynamic of the nuclear region of ESO 362-G18, a nearby Sa/0 galaxy harbouring a Seyfert 1.5 nucleus.

This work is based on the two-dimensional stellar and gaseous kinematics of the inner 0.8x1.2 kpc^2 of this galaxy, from optical spectra obtained with GMOS on Gemini South. The stellar kinematics show an average velocity dispersion of ~97 km s^{-1}, circular rotation with a projected velocity amplitude of ~100 km s^{-1} (on average) and a kinematic major axis at a position angle of ≈128°. The gas kinematics is dominated by circular motions as well, but with its kinematical centre located slight, although significantly, further to the northwest than the stellar one (~1""), probably due to the present of a double peak both in the broad and narrow emission lines in the center zones of the integral field unit (IFU). With the aim to unveil the actual nature of these double peaked emission lines, we created a double gaussian fitting and a velocity map for each one. The results are currently under discussion, but early interpretation indicates the presence of a biconical outflow.

Edo Ibar

“VALES: The Valparaíso ALMA Line Emission Survey”

Abstract:
We present a new extragalactic survey using observations from ALMA to characterise galaxy populations at intermediate redshifts: the Valparaíso ALMA Line Emission Survey (VALES). In this work, we use ALMA Band-3 CO(1-0) observations to study the molecular gas content in a sample of 67 dusty main-sequence star forming galaxies up to z=0.35. The galaxies are far-IR bright [L_IR/Lo = 10^(10-12)] emitters selected from the H-ATLAS survey over ~160 deg^2. We have detected 49 galaxies down to an rms of ~2 mJy/beam at 40 km/s with a >5sigma peak flux line significance. We find a range of velocity integrated CO(1-0) flux densities of 2–21 Jy km/s, implying L'_CO luminosities in the range of (0.03–4)x10^10 K km/s/pc^2. We explore the star formation efficiency in these galaxies, finding that most follow a long-standing mode of star-formation with gas consumption timescales of 1-1.5 Gyr. A significant fraction of galaxies at z~0.1 present high gas fractions (f_gas>0.3) which are similar to those commonly seen in high-redshift systems. For the 21 galaxies we resolve, we provide a robust linear fit to the Schmidt-Kennicutt relation using disk-like galaxies. In this talk I will review the present state of VALES and the follow up campaigns designed from this sample.

Daniela Iglesias

“Debris disks with multiple absorption features in metallic lines: circumstellar or interstellar origin?”

Abstract:
A debris disk is commonly described as a second generation circumstellar disk composed of dust grains, planetesimals and possibly already formed giant planets.

It was long thought that debris disks were systems fully depleted of gas, but in the last few years the presence of gas has been detected in a handful of them. The nature of this gas is still under debate; it may be residual gas (leftover from earlier stages of the disk) or second generation gas (generated by falling evaporating bodies), however, both possibilities would have great implications in the process of planet formation and evolution.

An efficient way to detect this gas in debris disks is monitoring gas tracers using multi-epoch high-resolution optical spectroscopy. A detection of gas in the line of sight of the star shows up as a very narrow absorption feature superposed to the photospheric absorption of lines such as Ca II or Na I, which are good gas tracers.

When using this method to detect gas in debris disks it is of foremost importance to distinguish these features from the ones caused by the presence of clouds in the interstellar medium. Interstellar gas in the line of sight of the star can be easily confused with circumstellar gas because of their similar characteristics, therefore it is necessary to furtherly analyse these absorptions in order to properly determine their origin.

In the course of my thesis, I've been analysing such absorptions in a large sample of debris disks and in this talk I present 27 particularly interesting objects that exhibit multiple gas

features. I discuss the possible origin of this gas based on its properties and put it in the context of the star properties and its debris disk.

J

Yara Jaffe

“The hard life of galaxies in galaxy clusters”

Abstract:
In a hierarchical Universe, galaxies migrate from low to high density environments. As this happens, they can lose their gas reservoirs via different mechanisms, eventually quenching their star formation activity. Several mechanisms quenching galaxies in galaxy clusters have been proposed, including gravitational interactions, and ram-pressure stripping by the hot intra-cluster medium. The most spectacular examples of ram-pressure stripping in action are the so-called "jellyfish" galaxies, that show extended tails of stripped material. I will talk about current efforts to understand gas stripping processes in galaxy clusters, including the first large homogeneous search of jellyfish galaxies in the local Universe, and the first results from GASP, an ongoing MUSE@VLT large programme that aims at studying the spatially resolved properties of ~100 of these objects.

James Jenkins
“The discovery and characterisation of the nearest exoplanet Proxima b”

Abstract:
I will present our discovery of the terrestrial mass planet orbiting in the habitable zone of Proxima Centauri, the nearest star to the Sun. I will show how we discovered this planet, dubbed Proxima b, ruling out the source of the signal as being due to stellar magnetic activity, and then I will briefly discuss the possibilities for this planet to be habitable. Finally, I will discuss additional follow-up we have performed on Proxima b and what the future holds to characterise the planet and the Proxima Centauri system.

Matias Jones

“Determination of companions mass using combined radial velocity and astrometric data”

Abstract:
Spectroscopic data allow us to derive projected (minimum) masses of unseen orbiting companions, such as planets, brown dwarfs and stellar binaries. However, by combining radial velocities and astrometric data it is possible to derive mass ratios or in some less favorable cases, to place an upper mass limit for the companion. Moreover, it is possible to derive true mass of the companion, when the mass of the primary is known.
In this talk I will present combined radial velocity measurements with Hipparcos astrometric data of a sample of giant stars, which are known to host substellar (planet and brown dwarfs) and binary companions. Most of these companions were found as part of the EXPRESS planet

search program (Jones et al.2011). In the case of the substellar companions, I derived upper mass limits, while for the sample of spectroscopic binaries I measure true mass of the secondary.

K

Antonios Katsianis

"The evolution of the observed and simulated star formation rates of z ~ 0-8 galaxies"

Abstract:
I present the evolution of the Star Formation Rates (SFRs) of z ~ 1-7 galaxies using a compilation of UV, IR and Ha observations. I compare the above constraints of SFRs with the results of cosmological hydrodynamic simulations run with the code P-GADGET3(XXL), which is an updated and improved version of GADGET-3. In our project we use a range of feedback prescriptions (e.g. AGN, SNe) to determine their effect on the simulated galaxy star formation rates and stellar masses. We find that an efficient feedback mechanism in the form of galactic winds is required to reproduce the observations at high redshifts (z ~ 4-7). In addition, I present the evolution of the observed and simulated star formation rate-stellar mass relations of z ~ 1-7 galaxies. Typically, a discrepancy is reported in the literature but I demonstrate that this tension possibly has its roots either to the uncertainty of the observational techniques that are commonly used or to the poor numerical modeling in the simulations of the last decade.

L

Francisco Ley

"Ion Acceleration in Accretion Disks: A possible source of Cosmic Rays"

Abstract:
Non-thermal ion and electron acceleration has been revealed to be ubiquitous in astrophysics. Some examples of environments where particles can be accelerated to ultra-relativistic energies include pulsar wind nebulae, supernova remnants, and accretion disks. The mechanisms responsible for this particle acceleration are still a subject of active research. A possible process at work is the so called stochastic acceleration of particles, where the energy reservoir for the acceleration is provided by astrophysical turbulence. In this work we investigate the role of kinetic, micro-turbulence in the stochastic acceleration of ions. We use first-principles particle-in-cell (PIC) plasma simulations to selfconsistently generate and maintain this micro-turbulence in its non-linear regime, focusing in the ion acceleration process. We show that, under particular astrophysical conditions, this type of turbulence can indeed produce a non-thermal ion component. We will discuss the micro-physics behind this phenomenon as well as the astrophysical scenarios where it could play an important role, for instance in the cosmic ray population in the Galaxy.

M

Giovannina Mansir

“Transit Modeling using MCMC and Gaussian Process Regression”

Abstract:
I present software which determines planetary transit system parameters using the BAsic Transit Model cAlculatioN (BATMAN), Markov chain Monte Carlo methods (emcee), and Gaussian process regression (George). The program requires estimations of: the ratio of the stellar and planetary radii, limb darkening coefficients, time of mid-transit, period, scaled semi-major axis, inclination, eccentricity, and periastron longitude. It fits for any to all of these parameters using one or more planetary transit light curves. The Gaussian process regression accounts for correlated red noise, making the software accurate in fitting partial transits.

Sebastián Marchi:

”Scaling Relations of Milky Way's Outer Halo Satellite Objects”

Abstract:
The study of properties of satellite stellar structures present in the Milky Way's halo can yield important information about the formation and evolution of the Galaxy. These substructures are classified in two main groups: globular clusters (GCs) and dwarf spheroidal galaxies (dSphs). During the last decade, new surveys and analysis techniques have increased the number of known satellites, more than doubling its population. These new discoveries, among which are low-luminosity dSphs and extended GCs, have changed our previous understanding. If previously GCs were thought to be compact and, in general, less luminous in comparison to dSphs, now this gap is starting to close, casting doubts about the different origin for this two types of structures. Moreover, it is known that dSphs are dominated by a dark matter halo, while GCs show no evidence of it. In this context, it is reasonable to think that the presence of dark matter may leave an imprint on the photometric and structural properties of these structures. To better understand differences and similarities between GCs and dSphs, their origin and what their role in the formation and evolution of the Milky Way is, it is necessary to characterize and homogeneously compare their structural and photometric properties. To achieve this, observations that are simultaneously deep, wide and homogenous are mandatory. In this work, I perform such a study by exploring relations between several parameters (luminosity, ellipticity, Sersic index, half-light radius and surface brightness) for 58 stellar structures present in the outer halo of our galaxy (beyond 25 kpc from the galactic center). For this, I use a new photometric dataset constructed from a survey that fulfills the previously stated requirements.

Jorge Martinez Palomera

“Compilation and characterization of light-curves catalogs for HiTS”

Abstract:
The High Cadence Transient Survey is an effort to characterize fast transient objects using high cadence, wide and deep observations, the data were taken using DECam at Blanco/CTIO. My work consist in generate catalogues of detected sources and build light curves of point-like, non-moving sources. My goal is classify all variable objects using time series analysis to extract features and build a classification model using Machine Learning tools, principally use transfer

and active learning to create training sets and then classify objects, respectively. We have about 2 millions light curves with data mainly in g and r band with a cadence of ~1.6 hours. I will present results about catalogues (photometry calibration, efficiency, limiting and completeness magnitude), light curves (main statistics), feature extraction and results of our classification.

Gustavo Medina Toledo

"Searching for distant RR Lyrae using HiTS"

Abstract:
We present the results from an RR Lyrae (RRL) search using data from the High cadence Transient Survey (HiTS). HiTS is a deep optical campaign carried out with the Dark Energy Camera (DECam) imager at the Blanco (4m) telescope on Cerro Tololo, Chile, aimed at detecting early supernovae explosions. However, the cadence of the survey and the strategy followed are well matched for RRL detection as well.
Using data from 2014 we were able to detect new RRL stars out to at least 100 kpc from the Sun. In this contribution I will discuss the astrophysical implications of the findings of the first campaign, as well as the preliminary results of the search for distant RRL stars using HiTS' data from 2015.

Ernest Michael

"Fiber-based heterodyne infrared interferometry: an instrumentation study platform on the way to the proposed Infrared Planet Formation Imager"

Abstract:
We present concept and encouraging experimental lab results for a near-infrared heterodyne interferometer prototype we develop based on affordable commercial 1.55μm fiber components. After a demonstration with own 14" Dobsonian telescopes, the prototype could connect existing mid-class telescopes in Chile. Due to the fiber technology as adapted also for ALMA, the concept is scalable for kilometric baselines, larger telescope numbers and mid-infrared wavelengths, and so is highly interesting for the currently proposed Planet Formation Imager (PFI) interferometer.

Juan Molina

"SINFONI-HiZELS: The dynamics, merger rates & metallicity gradients of 'typical' star-forming galaxies at z = 0.8–2.2"

Abstract:
We present adaptive optics (AO) assisted SINFONI integral field unit (IFU) spectroscopy of eleven Hα emitting galaxies selected from the High-Z Emission Line Survey (HiZELS). We obtain spatially resolved dynamics on ~kpc-scales of star-forming galaxies (stellar mass Mstar = 10^(9.5-10.5) Msun and star-formation rate SFR = 2--30 Msun yr^(-1) near the peak of the

cosmic star-formation rate history. Combining these observations with our previous SINFONI-HiZELS campaign, we construct a sample of twenty homogeneously selected galaxies with IFU AO-aided observations -- the `SHiZELS' survey, with roughly equal number of galaxies per redshift slice, at z = 0.8, 1.47, and 2.23. We measure the dynamics and identify the major kinematic axis by modelling their velocity fields to extract rotational curves and infer their inclination-corrected rotational velocities. We explore the stellar mass Tully-Fisher relationship, finding that galaxies with higher velocity dispersions tend to deviate from this relation. Using kinemetry analyses we find that galaxy interactions might be the dominant mechanism controlling the star-formation activity at z = 2.23 but they become gradually less important down to z = 0.8. Metallicity gradients derived from the NII/Hα emission line ratio show a median negative gradient for the SHiZELS survey of Δlog(O/H)/ΔR = --0.026±0.008 dex kpc^(-1). We find that metal-rich galaxies tend to show negative gradients, whereas metal-poor galaxies tend to exhibit positive metallicity gradients. This result suggests that the accretion of pristine gas in the periphery of galaxies plays an important role in replenishing the gas in `typical' star-forming galaxies.

Christian Moni Bidin

“Young stars in the periphery of the LMC”

Abstract:
Dynamical interactions with neighborhoods constantly occur during most of the lifetime of a galaxy, and they play a major role in molding its shape and its stellar content. Despite their vicinity, the complex interplay between the two Magellanic Clouds, their surrounding tidal features, and the Milky Way, is still poorly understood. We have collected intermediate-resolution optical spectra of thirty-one young star candidates in the periphery of the LMC, and measure their radial velocity, stellar parameters, distance and age. Our measurements confirm the membership to the LMC of six targets, whose radial velocity and distance well match those of the Cloud. These objects are all young (10-50 Myr) main-sequence stars projected between 7 and 13 degrees from the center. We find that our stars have low to moderate velocity differences with the predictions of a LMC disk model, indicating that they were formed in situ. Our study demonstrates that recent star formation occurred in the far periphery of the LMC, where so far only old objects were known, and where the gas density is low. Their spatial configuration appears ring-like and it is suggestive of a star-formation episode triggered by an off-center collision between the Small Magellanic Cloud and LMC’s disk.

Marcelo D. Mora

“Star forming regions in distorted galaxies: The Penguin (NGC2936) and NGC1427A”

Abstract:
Distorted galaxies are unique laboratories where the media get compressed triggering star formation. In this talk I will present the our latest results focused in two galaxies: NGC2936: "The Penguin" (Apr142) where we analyze selected forming regions and NGC 1427A where we zoom in into a particular star forming region.

Carlos Morales

“High spatial and high spectral resolution observations of the red giant Arcturus in the 2.3 micron CO lines with VLTI/AMBER”

Abstract:
Stars like the Sun experience significant mass loss in late evolutionary stages such as red giants. This is important not only for the evolution of the star itself but also for the chemical enrichment of the interstellar medium. Nevertheless the mass loss in red giants is not yet understood well. We present high-spatial and high-spectral resolution infrared interferometric observations of the well-studied red giant Arcturus (Alpha Boo;K1.5 III) with the AMBER instrument at the Very Large Telescope Interferometer (VLTI) in individual CO first overtone lines near 2.3 micron. The results in the continuum show an angular size of 20.5 mas and an increase in the size in the CO lines. This indicates the presence of an extended component. We spatially resolve the existence of an outer atmosphere and derive the physical proprieties by comparing the obtained AMBER data with semi-empirical models in which two extended, extra layers are added to hydrostatic photospheric models. We find out that the inner layer has a CO column density of 6e19 cm^-2, a temperature of 1400 K at 1.02 stellar radii. The outer layer is found to have a CO column density of 9e18 cm^-2, a temperature of 1300 K at 2.7 stellar radii. Since the previous observations of CaII and MgII lines in the ultraviolet band suggest the existence of a chromosphere in this region, our results indicate the coexistence of the chromosphere and the molecular atmosphere. This is the first time we spatially resolve and derive the physical proprieties of an outer atmosphere in a star with 4250 K, the warmest red giant with the molecular atmosphere measured.

Ricardo Munoz

“The Chilean Telescope Allocation Committee”

Abstract:
I will review the inner workings of the Chilean Telescope Allocation Committee (CNTAC) including relevant statistical information gathered over the years.

Nahir Muñoz Elgueta

“Physical properties of a near TDG candidate and its parent galaxy NGC 4656”

Abstract:
Interacting galaxies provide us an excellent laboratory for studying endless physical phenomena associated with these processes. For example, during collisions between galaxies, part of the neutral hydrogen that was originally located on the disks of such galaxies is ejected into intergalactic medium, forming intergalactic gas clouds, or even extended tails (caused by tidal

effects), which are rich in gas and can accommodate the formation of new stellar bodies. Some of these entities can be gravitationally stable and become tidal dwarf galaxies (TDGs).

In order to provide knowledge about TDGs , we present an analysis of the physical properties of NGC 4656 system and a TDG candidate located in it. We have used spectroscopic data of these regions, which were observed with GMOS instrument (multi-object mode) installed on the Gemini North telescope. We have found that the TDG candidate presents a low H-alpha emission in contrast to high UV emission. This suggests that the last major starburst ocurred within the last ~200 Myr and there is not recent star formation. TDG candidate has a low metallicity (12+log(O/H) ~ 8.1) similar to that found in its host galaxy NGC 4656 (12+log(O/H) ~ 8.2), however the latter has an active star formation.

Finally, Fabry-Perot data have allowed us to observe the ionized gas traced by H-alpha, and make a detailed kinematic analysis of these regions, which has shown us the complexity of this system and the possible nature of this TDG candidate. With all this information, we discuss if this object has a primordial or recycled origin.

N

Justus Neumann

“Photometry and kinematics in a mixer: A combined recipe for evaluating the nature of bulges using the CALIFA sample”

Abstract:
Understanding the nature of bulges in disc galaxies can provide important insights into the formation and evolution of galaxies. For instance, the presence of a classical bulge suggests a relatively violent history, in contrast, the presence of simply an inner disc (also referred to as "pseudobulge") indicates the occurrence of secular evolution processes in the main disc. However, we still lack criteria to effectively categorise bulges, limiting our ability to study their impact on the evolution of the host galaxies. In this talk, I will present a recipe to separate inner discs from classical bulges by combining five different parameters from photometric and kinematic analyses. I will also show the results of applying that recipe to a sample of 51 galaxies from the integral-field spectroscopic survey CALIFA. To aid in categorising bulges within these galaxies, we performed 2D image decomposition to determine bulge Sérsic index, bulge-to-disc light ratio, surface brightness and effective radius and we used growth curve analysis to derive a new concentration index, C_{20,50}. We further extracted the stellar kinematics from CALIFA data cubes and analysed the radial velocity dispersion profile. The results of the different approaches are in good agreement and allow a safe classification for approximately 75% of the galaxies. In particular, we found that our new concentration index performs better than the traditionally used C_{50,90} when yielding the nature of bulges. We also found that a combined use of this index and the Kormendy relation gives a robust indication of the physical nature of the bulge.

O

Keiichi Ohnaka

“Resolving the mass loss from stars in late evolutionary stages by high spatial resolution observations”

Abstract:
Studies of the mass loss from stars in late evolutionary stages are of utmost importance for improving our understanding of not only stellar evolution but also the chemical enrichment of galaxies. Despite such importance, the mass loss from cool evolved stars is one of the long-standing problems in stellar astrophysics. To solve this problem, it is essential to understand the physical processes taking place within ten stellar radii. Milliarcsecond-resolution achieved by optical/infrared long-baseline interferometry provides a unique opportunity to spatial resolve this innermost key region. In the last decade, long-baseline interferometric observations in the near- and mid-infrared succeeded in spatially resolving the atmosphere and innermost circumstellar environment of a number of evolved stars. Moreover, it is now feasible to spatially resolve not only inhomogeneous structures over the surface of stars but also the complex gas dynamics of the atmosphere just like observations of the Sun. I will present our recent results of milliarcsecond-resolution infrared imaging of evolved stars, aiming at (re)solving the long-standing mass-loss problem.

Felipe Olivares E.

“Correlations within the GRB-SN connection: SN luminosity standarizations for cosmology”

Abstract:
Long γ-ray bursts (GRBs) have been found in association with core-collapse supernovae (SNe) since the emblematic case of the GRB 980425/SN 1998bw. They are thought to be the final fate of some massive stars with main-sequence masses > 15 $M_{\odot}$. The GRB emission can be detected up to very high redshifts ($z \sim 9$) and their SN counterpart has been observed up to redshift of about 1. We managed to reduced the dispersion in the luminosities of GRB-SNe by using the SN light-curve stretch factor and the GRB spectral peak energy for a sample of 15 events in the redshift range of $0.01 < z < 0.68$. While SNe Ia and II deliver distances as precise as 7% (Hamuy et al. 1996) and 10% (Olivares E. et al. 2010), respectively, we show that GRB-SNe can determine distances with 13% precision. This results unfolds new opportunities to exploit GRB-SNe to probe the cosmic expansion of the Universe.

P

Nelson Padilla

”Redshift space distortions around voids”

Abstract:
In this talk I will present a new method to infer the growth parameter using measurements of the cross-correlation between voids and galaxies. This is a non-parametric method that takes advantage of the lack of a hexadecapole term in the linear theory approximation for this cross-correlation. Predictions will be shown on the accuracy of cosmological parameter constraints as obtained using numerical simulations.

Enrique Paillas

“Unveiling cosmology with void regions”

Abstract:
Cosmic voids are vast under-dense volumes in the large-scale distribution of galaxies in the Universe. According to results from numerical simulations, they are potentially powerful for cosmological tests due to their sensitivity to the dark energy equation of state and modified gravity models. Current and future large-scale galaxy surveys, such as eBOSS, provide a great opportunity to unveil the underlying cosmology of our Universe by studying void statistics. I will present an overview of the science that can be developed studying these objects, emphasising on the role they play in the evolution of the cosmic web and its connection to the physics of galaxy formation.

Diego Ignacio Pallero Astargo

“Tracing the Quenching History in Galaxy Clusters in the EAGLE Simulation”

Abstract:
One of the fundamental problems in modern astrophysics is the understanding of the role of environment in the evolution of galaxies.
Many works, both theoretical and observational, have focused on these studies, suggesting possible solutions to interpret the data.
Nevertheless, it is not yet clear what the main physical mechanisms that lead to the cessation of star formation, or quenching, in galaxies that reside in dense environments are.
We have embarked in a new project aimed at using the state of the art EAGLE hydrodynamical simulation to trace the quenching history of galaxies in the 10 most massive clusters of this sample. In particular, our study is aimed at linking the quenching history of galaxies with the assembly history of the clusters, providing in this way a further test of the hierarchical paradigm of structure formation. By using both empirically- and theoretically- based definitions to separate star-forming and passive (quenched) galaxies, we separate our simulated sample into galaxies that were quenched in the clusters (in-situ quenched) and galaxies that were quenched before their host halo was accreted on to the clusters (pre-processed).

We find that the largest fraction of galaxies ceased to form stars before they were accreted on to the clusters, suggesting that the pre-processing plays a decisive role in establishing the time-scales and the history of star-formation quenching in large-scale and massive structures.

We discuss the implications of our results in the context of galaxy evolution studies and outline the future directions of our project.

Blake Pantoja

“Direct Imaging of Low-Mass Companions of Stars from Radial Velocity Planet Search Programs”

Abstract:
Radial velocity measurements have long proven to be a powerful method of detecting low-mass companions to bright stars, but they come with the inherent limitation that only minimum masses can be constrained for these companions, since the system inclinations are unknown. Direct imaging, on the other hand, allows us to constrain the companion's inclination relative to an Earth-bound observer, and when combined with radial velocities, allows us to directly probe into the mass/period parameter space of any detected companions. By searching for targets with long-period radial velocity trends, we are able to search for objects with a known but unseen companion. I will present our project, set up in snapshot and deep follow-up phases to search for the unseen companions that appear in radial velocities, and that includes the analysis to our first direct detection, that of a fully convective, mid M-dwarf companion to one of the metal-rich and Sun-like stars from the CHEPS project, using ESO-SPHERE during Science Verification. The companion was found to be 4 mag fainter than the primary, at a separation of 25 AU. This discovery provides us with the exciting opportunity to further constrain the mass-luminosity relation for low-mass stars, particularly for super metal-rich stars, allowing us to expand our understanding of the most-common types of stars and substellar objects, along with future detections.

Pedro Pineda

“¿Qué hace un astrónomo en el mundo de las finanzas? “

Abstract:
Hacer hipótesis, revisar montañas de datos, encontrar soluciones y comunicarlo a la gente son características necesarias en un licenciado en astronomía que busca modificar y aportar al escenario en el que se desenvuelve.

Adele Plunkett

“Uncovering the protostars in Serpens South with ALMA: continuum sources and their outflow activity”

Abstract:
Serpens South is an appealing protostellar cluster to study due the combination of several factors: (1) a high protostar fraction that shows evidence for very recent and ongoing star formation; (2) iconic clustered star formation along a filamentary structure; (3) its relative proximity within a few hundred parsecs. An effective study requires the sensitivity, angular and spectral resolution, and mapping capabilities recently provided with ALMA. Here we present a multi-faceted data set acquired from Cycles 1 through 3 with ALMA, including maps of continuum sources and molecular outflows throughout the region, as well as a more focused kinematical study of the protostar that is the strongest continuum source at the cluster center. Together these data span spatial scales over several orders of magnitude, allowing us to investigate the outflow-driving sources and the impact of the outflows on the cluster

environment. At this meeting, we focus on the census of protostars in this cluster, numbering about 20, including low-flux, low-mass sources never before detected in mm-wavelengths.

Jose Prieto

“Interacting supernovae and other weirdos in ASAS-SN”

Abstract:
ASAS-SN (All-Sky Automated Survey for SuperNovae) is finding >50% of the bright (V < 17 mag) supernovae explosions all-sky, building a complete sample of nearby explosions that is ideal for detailed studies and rates estimates of different supernova types and sub-types. In this talk, I will present follow-up observations of rare supernova explosions discovered by ASAS-SN. Most of these objects show strong signs of interaction between the supernova shock and a dense circumstellar medium around the progenitor star, formed typically through multiple mass-loss episodes. Although rare, these objects are very important for understanding the latest stages of stellar evolution and mass-loss. The sample that I will present includes well-studied weirdos in all the main supernova spectroscopic classes: Type II, Ib/c, and Ia's.

R

VENKATESSH RAMAKRISHNAN

“Nuclear streaming in nearby AGN”

Abstract:
We study the process of feeding and feedback on the central region of active galaxies to understand the nuclear activity and galactic evolution. This study is being carried out through spectral-line observations in the millimetre (using ALMA) and infrared wavebands (using Gemini/GMOS-IFU). We map the spatial distribution and kinematics of both molecular and ionised gases in order to quantify the inflows and outflows, and also probe the kinematics of the narrow-line region to disentangle the mixed kinematic components. These results will be extended to study the systematic trends and correlations between the AGN properties and those of the host galaxy.

Ricardo Ramírez Reyes

“Photometric monitoring of Proxima Centauri to study its magnetic activity and flaring properties”

Abstract:
Recently the M star Proxima Centauri has received huge attention because of the discovery of a terrestrial planet orbiting in the habitable zone of the star, which takes on even more importance once we consider that Proxima Centauri is the nearest star to the Sun, at a distance of only 4 light years. M stars have recently been shown to exhibit a high probability of hosting planets, particularly in their habitable zones, nevertheless strong magnetic activity generally makes studying these stars in detail fairly difficult. This is also doubly difficult when we consider that a

high fraction of M stars regularly flare. Therefore, an in depth study of the nature of Proxima Centauri is necessary for the future understanding of Proxima b, or any other planets in the system.

I will present a photometric activity follow up of Proxima, consisting of observations taken from a few different telescopes; MONET, MOST, ASH2, HATSouth, and data observed from New Zealand and Easter Island, covering several different epochs. From this data I will discuss the prevailence flares, and the characteristics of the relative photometric changes with respect to time. Finally, I will conclude with a discussion about the magnetic activity of Proxima and how it could affect further observations when trying to characterise Proxima b or in the search for additional planets in the system.

Alessandro Razza

“Extinction laws towards supernovae with integral field spectroscopy”

Abstract:
Accurate measurements of the extinction along the line-of-sight of supernovae are essential for determining distances in observational cosmology. Extinction curves, commonly parametrized by the total-to-selective extinction ratio Rv, have been found to be steeper than the standard Rv = 3.1, with unusual low values inferred from Type Ia supernova (SN Ia) photometric observations, revealing peculiar dust properties of the interstellar medium (ISM).
Using Integral Field Unit (IFU) data, we estimate stellar population extinction by fitting population synthesis models to observations. To minimize the degeneracy between extinction, age and metallicity when measuring Rv, we combine UV photometry with optical spectra. Infrared photometry will be also used to model the levels of UV-optical extinction and reprocessed dust emission. Currently, a series of simulations were performed, where a known extinction was added to synthetic spectra and then fitted to measure Rv.
The goal is to apply this methodology to a full 4’ x 3’ mosaic of MUSE observations of the nearby (7.2 Mpc) spiral galaxy NGC 628, host of three SNe, to map the extinction of the galaxy at high spatial resolution (~ 1′′ corresponding to ~ 35 pc) and subsequently to a large sample of more distant SN host galaxies from AMUSING survey. "

Rodrigo Reeves

“LCT project: a sub-mm science/technology platform”

Abstract:
In this brief talk, we will present the LCT project and review its current status. The project seeks to upgrade and re-site the CSO telescope from its current site in Mauna Kea, to the Chajnantor area, where it will improve substantially its access to high impact wavelengths such as 350 um and above. The current partnership involves UdeC, Caltech and the Shanghai Normal University (ShNU) through CASSACA. This facility can become a transformational tool for national development, since it will be open for training of scientists and engineers, and for the development of state-of-the-art instrumentation. Funding is not in place to start the project in full

and we are therefore looking for partners open to contribute substantially. We will review the activities carried so far to raise interest among the international scientific community, a summary of the scientific goals and finally, we will present a development plan to do the initial work, commission the telescope and operate it for 10 years.

Claudio Ricci

“An X-ray view of galaxy mergers and obscured black hole growth”

Abstract:
Mergers of galaxies are believed to cause inflows of gas which activate accretion onto supermassive black holes (SMBHs). During this process the SMBH is predicted undergo through a phase in which it is enshrouded by gas and dust. However, due to the difficulty in detecting and studying these very obscured objects, before the advent of the hard X-ray satellite NuSTAR evidence confirming this idea has been indirect and inconclusive.

In my talk I will present the results obtained studying with NuSTAR a sample of 30 local Luminous and Ultra-luminous IR galaxies in different merger stages. We find that AGN in late-merger stage galaxies are more obscured than those in early-merger stage galaxies, and that the fraction of heavily obscured Compton-thick AGN in these systems is significantly larger than that of local non-merging AGN. This confirms the long-standing idea that galaxy mergers are able to trigger the inflow of material onto the close environment of SMBHs. In my presentation I will compare the observed connection between obscuration and the merger stage with numerical simulations, and discuss our results in the framework of galaxy evolution models.

Mario Riquelme

“A PIC Simulation Study of Electron Viscosity and Thermal Conduction in Collisionless Plasmas”

Abstract:
The efficiency of electron heating and thermal conduction are crucial ingredient for understanding the thermodynamic properties of astrophysical plasmas in various environments. In many of these plasmas, Coulomb collisions between particles are rare, so electron heating and thermal conduction are governed by kinetic plasma processes. I will review recent particle-in-cell (PIC) plasma simulation studies of these phenomena. I will also emphasize their relevance in different astrophysical environments, including low luminosity accretion disks (like in Sgr A*) and the intra-cluster medium.

Luis Rodríguez

“Thermal Evolution of Old Neutron Star”

Abstract:

Passively cooling neutron stars (NSs) are expected to reach undetectably low temperatures within less than 10^7 yr. However, likely thermal ultraviolet emission was observed from the Gyr-old millisecond pulsar PSR J0437-4715. A couple of mechanisms proposed in the literature could keep NSs hot beyond the standard cooling time. Acoording to Gonzalez & Reisengger 2010, the most important are Rotochemical Heating (Reisenegger 1995) and Vortex Creep (Alpar 1984). Now we are adding more heating mechanisms to our models, like Crustal Heating (Gusakov, Kantor & Reisenegger 2015), Polar Caps Heating (Harding 2007), Pair Breaking - Pair Formation (Flowers et. al. 1976), etc. New data from HST is contrasted with our models. The observation and understanding of cooling neutron stars can potentially provide information about the states of matter at supernuclear densities.

Bárbara Rojas Ayala

“The characterization of the tiny stars.”

Abstract:
The proper characterisation of a star is necessary to fully understand its nature. The M dwarf stars situate at the bottom of the main-sequence, linking the solar-type stars with the brown dwarfs. They are small, but their almost- to fully-convective bodies can create strong magnetic fields and large flares. By-products of their formation are some of the few exciting terrestrial planets found in the habitable zone of their hosts stars. Composing more than 2/3 of the stellar component of the Milky Way and with lifetimes that exceed the Hubble time, M dwarfs should be the benchmarks of the main-sequence stars. Unfortunately, it has been a challenge to accurately dissect them due to their small sizes, low masses, complex atmospheres, and intrinsic dimness at visible wavelengths. In this invited talk, I will review some of my personal efforts to properly characterise the M dwarfs, as well as the current limitations and challenges related to the understanding of their nature.

Jaime Andrés Rosales Guzmán

“Spectroscopic and photometric study of the eclipsing interacting binary V495 Centauri”

Abstract:
Double Periodic Variables (DPV) are among the new enigmas of semi-detached eclipsing binaries. These are intermediate-mass binaries characterized by a long photometric period lasting about 33 times the orbital period (Mennickent et al. 2003, 2012a, 2013, Poleski et al. 2010). The nature of second period is unknowed but probably linked to the variations in the strength of the disc wind or stellar dynamos. Also, they are considered as one specific evolutionary step for more massive Algols. We present a spectroscopic and photometric study of the DPV V495 Cen based on new high-resolution spectra and the ASAS V-band light curve. We have determined an improved orbital period of 33.492±0.0161 d and a long period of 1283 d for the DPV V495 Cen. Furthermore, we have assummed non-synchronous rotation semidetached configuration. We find a cool evolved star of M2 = 0.97 ± 0.2M , T2 = 5000 ± 250K and R2 = 19.7R and hot companion of M1 = 5.85 ± 0.3M , T1 = 14770 ± 500K and R = 2.88 ± 0.2R . The early type B dwarf is sourronded by a concave and geometrically thick disc, of radial extension of Rd = 37.4 ± 0.3R which contributes ~ 17 percent of the total luminosity of the

system at the V band. The system is seen under inclination i = 83○ .7 ± 0○ .2 and was found at a distance of d = 1343 ± 112 pc. The LC analysis to the DPV V495 Cen suggests that the mass transfer stream from L1 point to the impact region occurs until the outer part of the disc.

Monica Rubio

”Low metallicty molecular clouds”

Abstract:
Stars form out of molecular clouds. These clouds are dense concentrations of H2 that are traditionally traced in external galaxies using transitions of CO or other, more complex molecules. But dwarf irregular (dIm) galaxies seemingly contradict this fundamental picture. Tracers of recent star formation, such as Halfa or far-ultraviolet (FUV) emission, show that most dwarfs contain young stars and star clusters, but CO observations often yield only upper limits. The supposition is that H2 is actually present in star-forming regions in dIm galaxies even when CO is undetected. The structure of star-forming clouds at low metallicity is predicted to be different from that at high metallicity. As the metallicity drops, the cold and dense, CO-emitting part of a cloud where stars form shrinks relative to the warm photo-dissociation region (PDR) around it due to a corresponding lack of shielding by dust.

We will present CO observations with ALMA of star-forming regions at the lowest metallicities (13% solar) of the dwarf galaxy WLM, revealing tiny CO clouds inside much larger molecular and atomic hydrogen envelopes. The properties of the molecular clouds in low metallicity galaxies along a sequence of decreasing metallicity from the the SMC (20% solar) to WLM (13% solar) will be discussed.

Surangkhana Rukdee

“TARdYS: design of an exoplanet hunter for TAO”

Abstract:
The relatively close habitable zone to the host stars of the very common cool-low mass stars makes M-dwarfs attractive for finding habitable planets. Up to date only a few of these stars can be observed by visible high resolution spectrographs, since their spectrum peaks in the infrared. We develop Tao Aiuc high Resolution (d) Y band Spectrograph (TARdYS) for observing M-dwarfs in the southern hemisphere, where only a few high resolution near infrared spectrographs are available. TARdYS is a high resolution Echelle spectrograph (R>50,000 at 0.843-1.117 μm) to be installed at the Tokyo Atacama Observatory TAO 6.5 m telescope in Chile. We reduce aberration and noise through a white pupil design and placing the detector in a cryogenic environment cooled to 80K. Our optimization results in excellent resolution only limited by diffraction, even when taking realistic manufacturing and alignment tolerances into account. We will present design decisions leading up to our M-dwarf exoplanet detection strategy for the southern hemisphere, and opportunities for our upcoming exoplanet hunter.

S

Ricardo Salinas

“The overlooked role of stellar variability in the extended main sequence of LMC intermediate-age clusters”

Abstract:
Intermediate-age star clusters in the Large Magellanic Cloud show extended main sequence turn offs (MSTOs), which are not consistent with a canonical single stellar population. These broad turn offs have been interpreted as evidence for extended star formation and/or stellar rotation. Since most of these studies use single frames per filter to do the photometry, the presence of variable stars near the MSTO in these clusters has remained unnoticed and their impact totally ignored. We model the influence of Delta Scuti using synthetic CMDs, adding variable stars following different levels of incidence and amplitude distributions. We show that Delta Scuti observed at a single phase will produce a broadening of the MSTO without affecting other areas of a CMD like the upper MS or the red clump; furthermore, the amount of spread introduced correlates with cluster age as observed. This broadening is constrained to ages $ \sim$ 1--3 Gyr when the MSTO area crosses the instability strip, which is also consistent with observations. Variable stars cannot explain bifurcated MSTOs or the extended MSTOs seen in some young clusters, but they can make an important contribution to the extended MSTOs in intermediate-age clusters.

Luca Sbordone

“A tale of two elements: Sulphur and Zinc in our galaxy as seen by GES”

Abstract:
Sulphur (S) and Zinc (Zn) are rarely targeted by stellar abundance studies: they are difficult to measure (S in particular) and are considered to trace other alpha elements (for S) and iron (for Zn) in their abundance evolution. However, they bear great importance in Interstellar Medium studies because they are very volatile, and remain in the gas phase (where they can be measured) rather than forming dust. For all these reasons, they are the proxies of choice for alpha elements and iron in studying the abundances of Damped-Lyman-Alpha systems: it is thus important to investigate whether they do in fact behave as expected in local stars, where Fe and other alpha elements can be handily measured.

The Gaia-ESO (GES) internal data release 4 allows us to measure S abundances in ~1300 stars, and Zn in ~1700, Comprising local thin/thick disk dwarfs, and giants mostly in globular and open clusters over a variety of galactocentric radii. Sulphur appears indeed to behave as an alpha element (albeit with surprising results in 47 Tucanae), but Zn has a complex behavior, following Fe only partly, with signs of a more complex nucleosynthetic history than previously thought.

Dominik Schleicher

“The chemistry of star formation with KROME: chemical modeling from cores to filaments to galactic scales”

Abstract:
In this talk I will present our new simulation results based on the astrochemistry package KROME. I will specifically emphasize the importance of directly tackling chemical processes over a range of scales relevant to both galactic and extragalactic star formation. I will present simulation results investigating the chemistry of dense cores and filaments, which have been shown recently to be the immediate sites of both low and high mass star formation. As an example, I will present simulations on chemical deuteration processes in dense cores, showing that the observed deuteration fractions can be obtained for a large range of initial conditions. I will then discuss the connection to the galactic scale ISM though simulations of isolated spiral galaxies focused on the formation of the molecular gas. In a brief outlook, I will discuss realistic future observations that will directly test our simulation results. Ultimately, identifying the main physical drivers of star formation, and thus its chemistry, requires an assessment of the relative roles of turbulence, gravity, and magnetic fields; the KROME package is built to easily couple to state-of-the-art MHD simulations.

Linda Schmidtobreick

"The hunt for ancient novae"

Abstract:
A nova eruption in a cataclysmic variable (CV) is a thermonuclear explosion on the surface of the white dwarf primary once it has accreted a critical mass from
its late-type companion. During the eruption, material is ejected into the interstellar medium forming an expanding shell which can been observed once its size is sufficiently large to be separated from the inner binary. The presence of such a shell provide the unambiguous evidence that the CV underwent a nova eruption in the past.

I will present some preliminary results on our deep wide-field Hα+[N II] survey of cataclysmic variables to search for remnant nova shells around these objects. We find no evidence for nova shells in any of our fields. This non-detection is in strong contradiction to the detection probabilities expected from the average mass transfer rates of these systems and strongly hints that inbetween nova eruptions, cataclysmic variables undergo a cyclic evolution with a long time of low mass-transfer rate or even stand-still.

Fernando Selman

"A quantitative look at the ionized gas in the tail of IC3418."

Abstract:
MUSE superb capabilities for quantitative spectroscopy of extended objects is used to study the nature of the HII regions in the tail of IC3418. In this contribution I will show the results obtained from MUSE science verifivation data and will present the characteristics of these HII regions.

Karleyne Silva

“High and low states of polars from CRTS survey”

Abstract:
Polars are cataclysmic magnetics variables, binary systems composed by a highly magnetic white dwarf (WD) star accreting matter from a low mass red dwarf companion via Roche lobe overflow, which is captured by the WD’s magnetic field and channelled to the surface, forming an accretion column. Cyclotron and bremsstrahlung radiation dominate the infrared/optical and X-ray emissions of these systems, respectively. Polars can show an optical brightness variation of up to 3 mag due to the cyclotron beaming combined with the orbital motion, and could also show long term variation of 2-3 magnitudes, in at least three different states: high, intermediate and low brightness. The explanation for this long term variations is the fluctuation in the mass accretion rate itself, however what switch off and on the mass transfer is still unknown. A possible explanation comes from the magnetic spot model (MS), where the companion star is active and sunspots in the L1 region could decrease the mass transfer, therefore linking the high and low states with the companion star activity cycles. A second possibility comes from the magnetic locking model (ML), where the WD’s magnetic field regulates the flux of accreted matter, relating it with variations of the WD’s magnetic field. A previous study alongside the long term variation of the polar AM Her indicated that the magnetic locking model offered an good explanation for its behaviour, however it is unclear if this is a common behaviour among all Polars or if it is a special/singular/unique case. We extended this study to investigate the optically high and low state of 26 polars observed by the Catalina All Sky Survey along 10 years. Although the period of observation is smaller than what was analysed for AM Her, we can already see similar behaviour in the data for some of these systems. Here we present the complete analysis of this sample and discuss it in the light of magnetic spot versus locking models.

R. Chris Smith

“Update from AURA: CTIO, Gemini, SOAR, LSST, and other projects”

Abstract:
AURA Observatory continues to provide new opportunities for users of the facilities of CTIO, Gemini, and SOAR, as well as some of the smaller projects on our site. This talk will provide a brief overview of the instrumentation available on these AURA Observatory facilities (Gemini will be covered in more detail a separate talk) and an update on the progress on our newest project, LSST.

Maritza Soto

“SPECIES: Spectroscopic Parameters and atmosphEric ChEmIstries of Stars”

Abstract:
SPECIES is a new algorithm for the automated computation of stellar parameters such as temperature, metallicity, mass, among others. This was motivated by the different values and

systematic offsets found in the literature for these parameters. This offsets can affect the orbital parameters for many extrasolar planets, due to the great effect the host star has in their detection and subsequent analysis. They also affect the different theories currently being studied about the formation and evolution of these planetary systems. With this new code, we will present new values for these stellar parameters, computed in a homogeneous way, for different types of stars currently being studied in search for extrasolar planets.

Piera A. Soto King

“Stellar clustering in the dark filament IRDC 321.706+0.066”

Abstract:
Context. We investigate the star formation process in the infrared dark cloud IRDC 321.706+0.066, where are located three infraredclusters recently discovered by Barbá et al. (2015) using images of the VISTA Variables in the Vía Láctea (VVV) public survey: LaSerena 210, 211 and 212.Aims.The aim is to characterize the stellar content of the three clusters and to investigate the star formation sequence in a filamentarydark cloud.Methods.We present a new photometric analysis of VVV images, and we use data from 2MASS,SpitzerGLIMPSE,SpitzerMIPS,WISE and ATLASGAL surveys. VVV photometry is performed in an area of 3535 arcmin2Results.We confirmed the presence of three VVV clusters La Serena 210, 211, and 212. Cluster La Serena 210 is specially important because it is associated with the EGOG321.94-0.01, the water maser source (G321.935-0.005), and the ammonia dense core (G321.919-0.0010-032.0), all ingredients that indicate ongoing star formation. Also, we propose a new cluster (IRSCG321.712+0.065) associated to the molecular cores IRDC321.73-2 and IRDC321.73-3

Mario Soto Vicencio

“Proper motions in the Galactic Bulge and Multiple Stellar Populations in Globular Clusters using HST”

Abstract:
I will report on two currently ongoing projects based on Hubble Space Telescope (HST) data. The first project studies the proper motions in several low foreground extinction windows of the Galactic bulge in 10 fields strategically placed on both ends of the Galactic bar and the Galactic minor-axis.
The second project attempts to characterise the multiple stellar populations patterns in a sample of 57 globular clusters by observing them in the UV/blue WFC3 UVIS filters F275W, F336W, and F438W.
A detailed account of both project motivations and techniques will be presented, as well as their respective current status.

Sebastian Markus Stammler

“Can Ice Lines create Rings? – The Influence of Ice Lines on Dust Growth in Protoplanetary Disks”

Abstract:
Ice lines are special locations in protoplanetary disks at which phase transitions between the solid and the gaseous phase of volatile species (e.g. H2O, CO, CO2, ...) occur. Inside of ice lines the temperatures are high enough for volatiles to get evaporated, while outside of ice lines they freeze out as ice where they can then be accreted by larger bodies. Ice lines are therefore of special interest in planetary sciences since they influence the composition of dust and planetesimals in protoplanetary disks.

In addition to that, ice lines also have an effect on the coagulation physics of colliding dust particles. Of special interest is hereby the water ice line. Since water ice can form hydrogen bonds, dust particles consisting of water ice are therefore more sticky and can withstand higher collision velocities before they fragment. Dust outside the water ice line can consequently grow to larger sizes compared to dust inside the water ice line where all the water is evaporated.

Furthermore, ice lines of volatile species that cannot form hydrogen bonds can also affect the efficiency of dust growth. Particles that drift inwards through ice lines lose their respective volatile species through evaporation. This newly created vapour can then diffuse outwards in the disk – back through the ice line – and can re-condense on the particles there. It will mostly condense on small dust particles since they contribute most to the total surface area available. This leads to larger monomer sizes within dust aggregates in regions just outside of ice lines. Laboratory experiments have shown that the fragmentation velocity of dust aggregates is inversely proportional to their monomer size. Thus, particles just outside of ice lines are less robust and more likely to fragment in collisions. Since smaller fragments, that resulted from these collisions, are less affected by radial drift this effect leads to a pile-up of material in these regions of re-condensation.

We developed a model for dust growth and transport in viscously evolving protoplanetary disks to investigate the effect of ice lines on the overall structure of those disks. Our model includes coagulation and fragmentation of dust particles by solving the Smoluchowski equation, radial drift and turbulent diffusion of dust particles, evaporation and condensation of volatiles, and viscous accretion of multiple gas species.

Our results show that ice lines indeed create ""traffic jams"" due to lower fragmentation velocities caused by re-condensation in regions just outside of ice lines. These dust enhancements are seen as ring-like features in radiative transfer images of our models. This effect is universal for any ice line and does not depend on the chemical species. The strength of these rings, however, depends on the abundances of the volatiles and is most prominent for the most abundant species.

Amelia Stutz

“Beyond turbulence: a fundamentally different mode of cluster formation in Orion”

Abstract:

Stars form in clusters and clusters form across the Universe. By scrutinizing the nearest laboratory for a cluster in formation (Orion A's Integral shaped filament; ISF) we gain new insights into cluster-formation physics. We argue that Orion hosts a fundamentally different mode of star cluster formation relative to the nearby clouds (e.g., Taurus) that have been studied to death. By comparing 3 constituents of Orion A (gas, protostars, and pre-main-sequence stars), both morphologically and kinematically, we show the following. Essentially all of Orion A's Integral Shaped Filament (ISF) protostars lie superposed on the ISF, while almost all pre-main-sequence (Class II) stars do not. Combined with the fact that protostars move < 1 kms relative to the filament, while stars move several times faster, this implies that a slingshot mechanism may eject protostars from the dense filamentary cradle, thereby cutting off their accretion of new gas. The ISF is the 3rd in a series of star bursts that are progressively moving south through Orion A, with separations of ~ 2 Myr in time and ~ 3 pc in space. This, combined with the ISF's observed undulations (spatial and velocity), suggest that repeated propagation of transverse waves thru the filament is progressively digesting the gas that formerly connected Orion A and B into stars in approximately discrete episodes. The presence of transverse waves implies the action of a buoyant restoring force acting against gravity. Combined with previous observations of magnetic field geometry and strength in the ISF, this suggests that the ISF transverse waves are magnetically induced. The presence of straight filaments in low mass regions (e.g., Taurus and L1641) as well as in turbulence simulations indicates that Taurus-like filaments are a direct reflection of initial conditions. In contrast, the observed undulations of the ISF, the fact that the ISF is the only nearby cluster in formation, the fact that it has survived repeated burst of intense star formation, and the equality between the inferred gravitational potential energy and magnetic energy on ~ 1 pc scales near the filament ridge, together lead to the following conclusion. The key physical difference in Orion is that it is massive enough to have survived initial star formation episode, allowing the ISF to undergo internal evolution leading to concentration of B-fields confined by a deep gravitational potential well.

T

Baitian Tang

“Two Groups of Red Giants with Distinct Chemical Abundances in the Bulge Globular Cluster NGC 6553 Through the Eyes of APOGEE”

Abstract:
Multiple populations revealed in globular clusters (GCs) are important windows to the formation and evolution of these stellar systems. The metal-rich GCs in the Galactic bulge are an indispensable part of this picture, but the high optical extinction has prevented extensive research. In this work, we use the high resolution NIR spectroscopic data from APOGEE to study the chemical abundances of NGC 6553, which is one of the most metal-rich bulge GCs. We clearly separate two populations of stars in C and N in this GC for the first time. NGC 6553 is the most metal-rich GC where multiple population phenomenon is found until now. Substantial chemical variations are also found in Na, O, and Al. However, the two populations show similar Si, Ca, and iron-peak element abundances. Comparing with other GC studies, NGC 6553 shows similar chemical variations as other relatively metal-rich GCs. We also confront current GC formation theories with our results, and suggest possible avenues for improvement in the models.

Valeria Tapia

“Broadband optics systems for ALMA Band 1 and Band 2+3”

Abstract:
ALMA is the most advanced radio astronomical facility in the world, providing high sensitivity between 35 and 950 GHz, divided in 10 bands. Up to now, the largest fractional bandwidth of all ALMA bands corresponds to Band-1, covering the frequency range from 35 to 50 GHz, with the goal of minor degradation up to 52 GHz. Nevertheless, ALMA carries out a permanent upgrading plan which, for the receivers, is focused on achieving better sensitivity and larger bandwidths. As result, an international consortium works on demonstrating a prototype receiver covering currents Bands 2 and 3 (67 to 116 GHz) which corresponds to a fractional bandwidth of 54%. Optics is one of the most challeging receiver subsystem, as first subsystem of the receivers, low noise figure and máximum aperture efficiency are fundamental for best sensitivity. However, a conjunction of several factors makes extremely challenging to achieve these goals.

We present the design, implementation and characterization of refractive optics solution. Results indicate an excellent performance in good agreement with simulations and fully complies ALMA specs.

Nicolas Tejos

“Probing diffuse baryons in the intra-cluster medium of galaxy clusters”

Abstract:
I will present results on our on going campaign to detect and characterize diffuse baryons in the intra-cluster medium of galaxy clusters at 0.1<z<0.5. We have used HST/COS to observe background QSOs whose sightlines intersect foreground galaxy clusters at impact parameters between 0.2-2 R_vir. With this dataset we can provide a first assessment on the amount of cool (T~10^4K; traced by narrow HI Lya absorption) and warm (T~10^5-10^6 K; traced by OVI and broad HI Lya absorption) gas phases co-existing within the much hotter (T>10^7 K) intra-cluster medium traced by X-ray emission (if any). By surveying for galaxy members close to the QSO sightlines, we can also assess whether the cluster environment has affected (e.g. truncated) their extended gas halos usually observed in more isolated environments.

Joanna Thomas-Osip

“The Gemini Science User Support Department: A community-centered approach to user support”

Abstract:
The Gemini Science User Support Department (SUSD) was formed to create a collaborative community of users and staff and to consolidate existing post-observing support throughout the observatory for more efficient use of resources as well as better visibility amongst our user community. Our mission is to advocate for the users and enable investigators to produce world-

class scientific results in a timely manner. Shortly after its creation, the SUSD conducted a complete revision of the communication cycle between Gemini and its community of researchers from the perspective of an astronomer interested in using Gemini for their research. This exercise led to a series of proposed changes that are currently under development (e.g. a new website and a new helpdesk system among others). Additionally, we maintain public and proprietary Gemini data in an easily accessible archive, provide easy to use tools for accurate data reduction and instructions to use them, and coordinate with NGOs for user support within each partner community. The Data Reduction User Forum is intended to bring the Gemini community together to exchange their ideas, thoughts, questions and solutions about data reduction, a sort of Reddit, StackOverflow or Slashdot for Gemini data. Following recommendations from Gemini users, new capabilities were added to the forum, like email notifications, and a voting system, in order to make it more practical. Posts are increasing so check it out and start a conversation.

Sergio Torres Flores

“Fabry-Perot observations with ground layer adaptive optics: The kinematics of 30 Doradus"

Abstract:
Giant HII regions (GHR) are known for containing massive stars. The strong stellar winds associated with these stars can modify the kinematics of the interstellar medium, producing expanding bubbles, shells and shocks. In addition, the final evolutionary stage of these massive stars (e.g. supernova) can inject an important amount of energy in the interstellar medium, producing large bubbles, which are usually linked with X-ray emission. In this context, GHR are ideal laboratories to study the effect of strong stellar winds and stellar evolution on the kinematics of the warm ionized gas. One of the best tools to study the kinematics of GHR is the use 3D spectroscopy, which could provide kinematic information for an extended object. In this talk we present new high-resolution 3D data of the GHR of 30 Doradus, which has been obtained with SAM-FP, a Fabry-Perot instrument mounted inside the SOAR telescope Adaptive Optics Module. This configuration allowed us to obtain an Halpha data-cube with a high spatial and spectral resolution (0.6 arcsec or 0.15 pc and R=11200), in a field of view of 3'x3'. Using this data set, we found a complex kinematic in 30 Doradus, where multiple Halpha profiles can be seen in different regions of the nebula. We found a new expanding bubble South to R136, which has an expansion velocity of 29 km/s. The velocity field and dispersion velocity maps shows an extremely complex kinematics. This data set reveals the power of SAM-FP, which can provide data-cubes with an excellent spatial and spectral resolution, in a field of view of 3'x3'.

Ezequiel Treister

“The Role of Major Mergers in Black Hole Growth and Galaxy Evolution”

Abstract:
A clear picture is emerging in which rapid supermassive black hole (SMBH) growth episodes are directly linked to major galaxy mergers, while slower growth phases can be triggered by secular (internal) processes and/or minor mergers (Treister et al. 2012). In this scenario, the more traditional Active Galactic Nuclei (AGN) unification paradigm in which orientation is the main

parameter only holds at lower luminosities, while for the more violent accretion events, triggered by major mergers, we find evidence for an evolutionary sequence in which the AGN is first heavily obscured (Compton-thick), to then reveal an unobscured quasar.

In this talk, I will present observational evidence in support of this scenario, both in the local Universe and at high redshifts. In particular, I will discuss the main results from a NuSTAR AO-1 program aimed to obtain high energy, E>10 keV, observations for a sample of 12 nearby galaxies undergoing major mergers. These data allow us to detect even heavily obscured SMBH growth episodes, including the detection for the first time of a hidden AGN in NGC6286 (Ricci et al. 2016). Then, I will present the first results from our program aimed to obtain optical and near-IR Integral Field Unit (IFU) spectroscopy and ALMA maps for a sample of confirmed nearby dual AGN (separation <10 kpc), including the archetypical galaxy NGC6240. Clear evidence for complex morphologies and kinematics, outflows and feedback effects can be seen in these systems.

The importance of these high-luminosity, merger-triggered, obscured SMBH growth episodes, identified in the IR as ULIRGs, for the cosmic history of SMBH growth and its connection to galaxy evolution will be discussed.

Paulina Troncoso Iribarren

“UVAS: the U-band Chilean extension of the ATLAS survey”

Abstract:
The ATLAS survey aims to map 4500 square degrees of the sky in the ugriz optical bands. The VISTA survey will also map the same area in the near infrared wavelengths.
A group of Chilean astronomers (P.I. L. Infante) in collaboration with the ATLAS consortium decided to join this initiative by proposing to ESO the increment of the depth of the U-band observations. This extension of the survey was approved and it is dubbed UVAS, the U-band Chilean extension of the ATLAS survey.
This extra depth in the U-band, doubling the ATLAS exposure time, allows time variation studies as well as a more accurate description of faint objects in this band such as dropouts galaxies, QSOs, etc.
In this talk, I will review these surveys, describe the available survey products, and invite the Chilean community to use this first data release.

Mikko Tuomi

“Planets orbiting M dwarfs in the Solar neighbourhood”

Abstract:
The most numerous stars, M dwafs are also comnmonly hosts to systems of low-mass planets. We present results regarding the occurrence rate of such planets and their orbital properties based on radial velocity surveys. According to our results, there are on average at least 2.5 planets per M dwarf stars and a large fraction of the mare classified as 'habitable-zone super-

Earths'. The newly emerging population of such candidate habitable planets has implications on the possibilities of finding Earth-like living planets, should they exist, in the near future.

U

José Utreras

“Unveiling the role of galactic rotation on star formation”

Abstract: Knowing how efficiently stars are formed in galaxies is fundamental to understand the evolution of our universe. Unfortunately, several physical processes governing star formation are dynamically coupled in the non-linear regime, complicating the study of their independent effects. Here we use numerical experiments to study the effects of galactic rotation, employing the Adaptive Mesh Refinement code Enzo. By studying the Kennicutt-Schmidt and Silk-Elmegreen laws, and the dimensionally homogeneous equation proposed by Escala (2015) we find that galactic rotation decreases the efficiency of star formation in disk galaxies. We find that the relation formulated by Escala (2015) gets the correct effects of the concentration along the line-of-sight, suppressing the bi-modality of the Kennicutt-Schmidt law. Finally we show that the dimensionless efficiency of star formation is well represented by a exponentially decreasing function of $\Omega\tau$, where Ω is the orbital frequency and τ is the initial free-fall time, leading to a unique galactic star formation law.

W

Wei Wang

“CASSACA's recent progress”

Abstract:
CASSACA (Chinese Academy of Sciences South America Center for Astronomy), also known as the China-Chile Joint Center for Astronomy (CCJCA) is a newly founded institute in 2013 concentrating on developing astronomy research collaborations between China and Chile,which also serves as a collaboration center for astronomy between China and other South America countries. The center is constructed in the mutual interests of CAS and CONICYT. After 3 years of operations, we have been growing and developing, thanks to the support and interests of Chilean Astronomy Community. Here we will present a progress report, and to seek more and better opportunities, more interests, that will benefit both Chile and China.

Lingzhi Wang

“Na absorption lines in Type Ia Supernovae”

Abstract:
Supernova environments plays an important role in probing their progenitor system and measuring the cosmological distance. As SN environment indicator, the studies of Na I D have gained much attention recently from high resolution spectra studies (R>20,000). Here,from the

~5900 low resolution spectra (R<10,000), the correlations between SN colors, EW Na I D and Na I D velocities can be detected and the corresponding methods will be applied to analysis the 3D data cubes.

Linda Watson

"The Resolved Vertical Structure of Molecular Gas in Edge-on Disk Galaxies"

Abstract:
There is a transition in the appearance of dust in optical images of edge-on, bulgeless disk galaxies at a circular velocity of 120 km/s (stellar mass ~ 10^10 M_sun). This transition is most likely due to a transition in the dust scale height, but could also be explained by a transition in the dust-to-gas ratio or in the properties of the stellar disk. I will present CO(2-1) data from the Submillimeter Array that spatially resolve the vertical distribution of molecular gas in two high-mass, edge-on galaxies. I will compare our direct measurements of the scale height of the cold interstellar medium to predictions from radiative transfer models, which simultaneously fit the optical appearance of the galaxy and the dust spectral energy distribution. Finally, I will describe how ALMA dust continuum and CO emission-line data for edge-on galaxies would finally allow us to test the hypothesis that there is a dust scale height transition at 120 km/s.

Y

Constanza Yovaniniz

"Detection and Characterization of RR Lyrae in Extragalactic Fields"

Abstract:
RR Lyrae are a type of variable star that can be used as a standard candle to derive precise distances. They are commonly found in the galactic disk and the closer regions of the halo, with the most distant RR Lyrae found at a distance close to 100kpc. In this work we analyze multiband infrared data (YJHKs) taken from the UltraVISTA survey to search for distant RR Lyrae candidates in the COSMOS field. Stars found in this field are very likely to be in the outer regions of the galactic halo, which would give us more information on the dark matter halo and structure of our galaxy. Given the cadence of the UltraVISTA survey, which is not originally aimed at variability studies, we also test the accuracy of the method used -the generalized Lomb-Scargle periodogram- for different parameters such as period and cadence.