Universidad de Valparaíso CHILE

Instituto de Física y Astronomía
Facultad de Ciencias, U. de Valparaíso

INSTITUTO FISICA Y Astronomía

SEMINARIOS ASTROFISICOS

Lista de seminarios astrofísicos para Profesores, Postdocs, alumnos de Postgrado y Pregrado

Sala Juan Mouat, Facultad de Ciencias, Gran Bretaña 1111, Playa Ancha, Valparaíso.

Año 2015

Martes 20 de Enero, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Franz Bauer, Pontificia Universidad Católica
"The High-redshift Universe through Nature's Lens"
Hubble and Spitzer have recently undertaken a revolutionary deep field observing program called the Frontier Fields, which uses high-magnification clusters of galaxies to act as gravitational telescopes to delve deeper into the Universe than ever before and provide a first glimpse of what JWST will likely see. These images have begun to reveal distant galaxy populations ~10-100 times fainter than any previously observed, improving our statistical understanding of galaxies during the epoch of reionization, and providing unprecedented measurements of the dark matter within massive clusters. I will focus on several results that have obtained from the first two clusters in the series, including recent Chilean-led ALMA and MMIRS observations.

Martes 19 de Marzo, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dra. Elena Manjavacas, Max Planck Institut fur Astronomie, MPIA, Alemania
"Physical Characterization of Brown Dwarfs"
The initial mass function describes the distribution of masses for a population of stars and substellar objects when they are born. It defines the evolution of a population of stars and provides constrains on the star formation theory. The determination of the initial mass function in the substellar regime is still an open question in Astrophysics. Brown dwarfs do not have enough mass to sustain hydrogen fusion. As a consequence, mass and age are degenerate for these objects. An older high mass object may be indistinguishable from a younger low mass object. In this PhD thesis, through the characterization of brown dwarfs using several observational methods, I work towards solving the general problem of constraining the substellar initial mass function. In my first project, I calculated trigonometric parallaxes of a sample of six cool brown dwarfs. I determined the luminosity for our objects and I found that one of them might be a brown dwarf binary. In my second project, I confirmed the youth of seven brown dwarfs (ages between 1 and 150 Myr) using spectroscopic data. In the last project of this PhD thesis, I aimed to refine the brown dwarf binary fraction using spectroscopic data in the optical and in the near infrared for 22 brown dwarfs. I found six new brown dwarf binary candidates, two of them were previously known. The determination of distances, ages and the refinement of the brown dwarf binary fraction in this PhD thesis contribute to the determination of the initial mass function. In the next years, the Gaia satellite, the James Webb Space Telescope and the E-ELT will provide new data, allowing the discovery of new brown dwarf binaries, the constraining of atmospheric and evolutionary models, and the refinement of the intial mass function.

Martes 07 de Abril, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Gustavo L. Baume, FCAG (UNLP) - IALP (UNLP-Conicet), La Plata - Argentina
"Agrupaciones Estelares Jóvenes"
Los cúmulos estelares son objetos relevantes de las galaxias. Ellos son muestras representativas de las diferentes poblaciones que las componen y se estima que la mayoría de las estrellas se forma en estos ambientes.

Actualmente existe una amplia disponibilidad de datos astronómicos producto de los numerosos "surveys", de forma que el estudio de estos objetos puede sistematizarse aunque para ello es necesario disponer de herramientas adecuadas. En esta presentación se describiran entonces algunos de los estudios de diferentes tipos de agrupaciones estelares que estamos llevando a cabo y la descripción básica de las técnicas utilizadas. Los estudios incluyen tanto cúmulos inmersos y cúmulos abiertos jóvenes de la Vía Láctea como agrupaciones estelares en galaxias cercanas. La utilización de datos ópticos, infrarrojos y de radio en forma combinada ha permitido obtener los parámetros de las agrupaciones estudiadas, de su medio interestelar circundante y entender la interacción entre ellos. Estos estudios han ayudado además a delinear la estructura del tercer y el cuarto cuadrante de nuestra Galaxia

Martes 14 de Abril, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Xue Jian Jiang, Purple Mountain Observatory, Chinese Academy of Sciences, China
"Cold Gas Fraction and Infrared Properties in Nearby Star-Forming Galaxies"
Cold gas, especially molecular gas content plays a vital role in the formation and evolution of galaxies. We present CO J=2-1 observations towards a sample of nearby gas-rich star-forming galaxies selected from the ALFALFA and WISE catalogs, using the Sub-millimeter Telescope. Our sample is selected to be dominated by intermediate-M∗ galaxies. The scaling-relations between molecular gas, atomic gas and galactic properties (stellar mass, NUV−r and WISE color W3−W2) are examined and discussed. Our results show that (1). In the galaxies with stellar mass M∗ ⩽10^10 M⊙, HI fraction (f_HI ≡ M_HI/M∗) is significantly higher than that of more massive galaxies, while H2 gas fraction (f_H2 ≡ M_H2/M∗) remain nearly unchanged. (2). Comparing with f_H2, f_HI correlates better with both M∗ and NUV−r. (3). A new parameter, WISE color W3−W2 (12−m−4.6−m) is introduced, which is similar to NUV−r in tracing star formation activity, and we find that W3−W2 has a tighter anti-correlation with log f_H2 than the anti-correlation of (NUV−r) - f_HI, (NUV−r) - f_H2 and (W3−W2) - f_HI. This indicates that W3−W2 may be used to trace the H2 fraction in galaxies. For gas ratio M_H2/M_HI, only in the intermediate-M∗ galaxies it appears to depend on M∗ and NUV−r. We also find a tight correlation between the molecular gas mass M_H2 and 12−m (W3) luminosities (L_12−m), and the slope is close to unity (1.03 ± 0.06) for the SMT sample. This correlation may reflect that the cold gas and dust are well mixed on global galactic scale. Using the all-sky 12−m (W3) data available in WISE, this correlation can be used to estimate CO flux for molecular gas observations and can even predict H2 mass for star-forming galaxies. [The published paper is on http://arxiv.org/abs/1411.5020]

Martes 7 de Mayo, 2015, Organizado por el Insituto de Estadística de la U. de Valparaíso
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Michel Curé
"**Deconvolución de velocidades de rotación estelar"**
La velocidad de rotación de una estrella es un parámetro fundamental que determina la vida y evolución de una estrella. Lamentablemente no es posible medir esta velocidad en forma directa, sino que el producto V_rot *sin(i), donde V_rot es la velocidad de rotación e "i" es el ángulo de inclinación del eje de rotación de la estrella con respecto a la linea de observación. Cuando una cuenta con una muestra de {V_rot sin(i)} y desea obtener la distribución de V_rot, es necesario resolver un problema integral (Fredholm). Para esto se debe hacer suposiciones sobre la distribución de los ejes de rotación. En esta charla se discutirá el problema "standard" y su forma de resolución y nuevas hipótesis de como se distribuyen los ejes de rotación para muestras de cumulo estelares, en donde las estrellas están interactuando gravitacionalmente.

Martes 19 de Mayo, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Francois Menard, Deputy Director, UMI -- FCA, Dept. de Astronomía y Obs. Astronómico Nacional, Universidad de Chile
"The rotation of the spiral arms in the disk of SAO 206462"
SAO 206462 is a young Herbig Ae star still surrounded by its primordial, gas-rich, protoplanetary disk. The disk highlights two very distinctive features: first, it has a large inner gap indicating that perhaps one or more planets have already formed and have cleared the gap; second, the outer disk also features two well defined spiral arms. These too may be the trace of perturbing bodies (planets?) located inside the disk. But so far the evidence for planets is only indirect, they have not been imaged, not yet anyway! In this presentation I will show new optical and NIR deep images of the disk of SAO 206462 obtained with the MagAO system (Magellan Telescope, Las Campanas Observatory) and with the GEMINI South / GPI AO system in collaboration with colleagues from U. Valparaiso (and others). I will briefly describe the new images and compare them with archival data (from VLT/NACO and HST/NICMOS in particular). The main result I will discuss is the evidence that the spiral pattern in the disk is rotating with time. We will discuss the observed rotation rates of the spirals and the implications of these rates for the origins of the spiral pattern: planets or not?

Martes 26 de Mayo, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Aldo A. Valcarce, FONDECYT Postdoctoral Fellow, Instituto de Astrofísica, Facultad de Física, Pontificia Universidad Catolica de Chile, Santiago.
"Globular clusters' peculiarities and their role for understanding the formation of the Galaxy"
Globular clusters have been the best laboratories for testing stellar modelling for more than 50 years. However, modern observations revealed that globular clusters are more complex systems than they were thought pushing stellar modelling codes to their limits in order to reproduce all globular cluster peculiarities. In this talk I will review the newest discoveries in globular clusters and discuss how we can use them for answering key questions in stellar evolution and the Galaxy formation.

Martes 02 de Junio, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Maxim Dvornikov, Universidad de Sao Paulo, Brazil.
"New model of strong magnetic fields in magnetars"
Magnetars are neutron stars having extremely strong magnetic fields B > 10^15 G. Despite the existence of numerous models for the generation of such magnetic fields, the issue of the origin of magnetic fields in magnetars still remains open. We propose the new model for the generation of strong magnetic fields in magnetars based on the magnetic field instability in matter composed of electrons and nucleons interacting by the parity violating electroweak forces. I start with the brief description of general properties of neutron stars and magnetars. Then I review some previous models for the generation of magnetic fields in magnetars. I also discuss the main physics ingredients of our model, which include the chiral magnetic effect, the Chern-Simons theory in presence of the electroweak interaction, and the magnetic helicity. Then I obtain the set of kinetic equations, which are used to describe the generation of magnetic fields in magnetars. In frames of our model, we can predict the growth of a seed magnetic field B_0 = 10^12 G, typical in a pulsar, up to the values observed in magnetars. Magnetic fields generated are of large scale comparable with the magnetar radius. The time of the magnetic field growth is 10^3 - 10^5 yr which is comparable with the ages of young magnetars. Within our approach we also predict the generation of the maximal helicity from initially nonhelical fields. The obtained results are compared with the predictions of other models.

Martes 09 de Junio, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dra Penélope Longa, Universidad de Warwick, Reino Unido
" Finding Orbital Parameters of Accreting Compact Binaries with Doppler Tomography""
Most stars in the Galaxy are found in multiple systems. In close binary stars, the evolution of one star affects its companion. Evolutionary expansion of stars allows for a mass exchange between the components. In most cases, the material from the less massive star forms an accretion disc around the heavier companion that has evolved faster to a compact stellar remnant, the final state of stellar evolution. We call these systems compact binary stars (CBs). The study of CBs is key to the development of two fundamental phenomena: accretion and evolution of binary stars. CBs are also crucial to a wide variety of astrophysical phenomena in the Universe, from short gamma - ray bursts, pulses of gravitational-waves emitted by stellar black holes, to the basis of the 2011 Nobel Price in physics: Type Ia supernovae, whose progenitors are white dwarf binaries. Statistical information on CBs can be deduced by extracting common properties and characteristic system parameter distributions from observed data. But, despite been fundamental for such a wide range of astronomical phenomena, our comprehension of their formation and evolution is still poor, mainly because of the lack of statistically significant CB's parameter samples. The lack of reliable orbital parameters estimation for CBs is mainly due to observational handicaps, namely, the accretion disc outshines the system components. Astronomers have developed different techniques to overcome this, but are often very dependent of the S/N of the data or only able to obtain via target of opportunity programs. In this talk I will present techniques, based on indirect imaging properties that overcome the main observational handicaps. We combine this technique with the exploitation of more "exotic" emission lines that trace the irradiated face of the donor star. We have successfully set dynamical constraints on the radial velocities of the binary components of hot and cool CBs to derive orbital parameters such as the binary mass ratio and the centre of mass velocity

Martes 16 de Junio, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Andrea Schmessane, candidata Doctorado, Universidad de Chile
"Fenómenos de onda análogos y anomalias de Wood en ondas de agua "
Analogías usando ondas de superficie en fluidos han sido utilizadas para describir, representar y entender agujeros negros [1], efectos cuánticos [2] (Aharonov-Bohm effect) y otros. Valiéndose de la transversalidad del fenómeno de onda, se ha logrado mostrar que cualquier sistema que las sustente debería exhibir fenomenología análoga. En la

presente charla se expone un trabajo experimental en ondas de agua, (y la observación directa de la deformación de la superficie del fluido utilizando un método ellamado Fourier Transform Profilometry -FTP), que describe la primera observación experimental de la anomalías de Wood en ondas de agua. En el contexto de la óptica, Wood observó como el patrón de interferencia que exhibe un haz de luz al pasar por una rejilla de difracción, disminuye o extingue su intensidad, esta anomalía fue explicada por Fano y Rayleigh, respectivamente, años mas tarde. Este evento constituyó los albores de la Física de Plasmones. El haz de luz es conducido paralelo al plano de la rejilla de difracción, el material de la rejilla, así como los factores geométricos tales como la periodicidad de esta y la forma de las rendijas de la rejilla, juegan un rol fundamental en la observación de las anomalías de Wood, junto con el estado de polarización de la luz incidente. En óptica hay todo un campo dedicado al estudio de las guías de ondas y sus propiedades. En el sistema de ondas mecánicas y macroscópico utilizado, se encuentran ventajas comparativas importantes con respecto al sistema microscópico donde típicamente se observan las anomalías de Wood, es así como la técnica de medición y el rango de estudio permiten la observación de la región de interacción de la onda con la materia (region de scattering), al unísono con el campo lejano de la onda, que es la región donde típicamente se puede acceder a la medición del fenómeno en cualquier sistema físico. La observación de la región de scattering constituye información nueva, sin precedentes y que bajo las adecuada formulación matemática análoga, su observación directa permite avances en el conocimiento del fenómeno de onda y en particular, de las propiedades de las anomalías de Wood, junto con la validación de los modelos que las tratan de modelar y predecir. El regimen de estudio donde se realiza el experimento, también es interesante a nivel de ingeniería conceptual, con respecto a la interacción de ondas con estructuras costeras y de su potencial aplicación a mecanismo de protección costera.
[1] R. Schutzhold, R and W.G. Unruh, Phys. Rev. D. \bf{66} 0044019 (2002)
[2] T. Frisch, Y. Pomeau, and S.Rica, Phys. Rev, Lett \bf{69}, 1644 (1992); Y. Pomeau,
and S.Rica, C. Rend. Acad. SC (Paris), \bf{316}, 1523 (1993)

Martes 23 de Junio, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dra. Alejandra Muñoz, Pontificia Universidad Católica, PUC
"Properties of submillimeter galaxies in a semi-analytic model using the "Count Matching" approach: application to the ECDF-S"

Fitting submillimeter galaxies (SMGs) into the current theory of galaxy formation has been a challenge since their discovery. They are the most luminous star-forming sources at the epoch where star formation peaks, being detected by their redshifted FIR emission from warm dust in the submm wavebands. Recent interferometric observations of the Extended Chandra Deep Field South show that the brightest sources detected by single-dish telescopes are comprised by emission from multiple fainter sources. In this talk I will introduce a new technique for modeling SMGs in light of these findings: the "Count Matching" approach. Using lightcones drawn from a semi-analytic model of galaxy formation, we choose physical galaxy properties given by the model as proxies for their submillimeter luminosities, assuming a monotonic relationship. We assign submillimeter fluxes to model galaxies so that the combined observed number counts for this field are reproduced. After turning the model catalogs given by the proxies into submillimeter maps, we perform a source extraction to include the effects of the observational process on the recovered counts and galaxy properties. We find that for all our proposed proxies, there are lines of sight giving counts consistent with those derived from single-dish observations, even for input sources with randomized positions in the simulated map. Comparing the recovered redshift, stellar mass and host halo mass distributions for model SMGs with observational data, we find that the best among the proposed proxies is that in which the submillimeter luminosity increases monotonically with the product between dust mass and SFR. This proxy naturally reproduces a positive trend between SFR and bolometric IR luminosity, and predicts that the majority of components of blended sources are spatially unassociated.

Martes 30 de Junio, 2015,
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Graeme Candlish, Investigador Postdoctoral. UDEC
" Simulations of Modified Gravity"

I will discuss the use of computational simulations in studies of the effects of modified gravity, at both galactic and cosmological scales. Such theories of modified gravity offer possibilities for understanding dark energy, and may provide an alternative to dark matter. The complexity of these theories, however, makes a numerical treatment challenging. I will talk about my work in developing a simulation code called RAyMOND, and applications of this code to galaxy interactions and cosmology, as well as discussing other numerical studies addressing dark energy. Finally I will talk about future developments, such as studies of coupled dark matter/dark energy models.

Martes 6 de Julio, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Johan Olofsson, MPIA, Heidelberg, Alemania

"Dust mineralogy in proto-planetary and debris disks"
The initial conditions of planetary formation are governed by the evolution of initially (sub-) µm-sized silicate dust grains in the early phases of young circumstellar disks. Dust grains are the building blocks of planets (which requires growth spanning over several orders of magnitude), and they provide clues to the dynamical evolution of the disk at all stages of the planet-forming process. Our knowledge about dust, and its evolution, has significantly improved during the past years, thanks to statistical studies at mid- and far-infrared wavelengths based on space-based missions such as Spitzer and Herschel. The mineralogical information (lattice structure, chemical composition, and grain morphology), as determined by spectroscopic observations, provide valuable constraints on the dynamical evolution of disks at various ages (e.g., radial and vertical transport, coagulation, fragmentation, and crystallisation). I will summarize our findings for circumstellar disks at different key steps of the planet-forming process, trying to connect them with our understanding of the solar system.
Johan Olofsson is visiting us from MPIA, Heidelberg, Germany. He did his PhD at former LAOG, now IPAG in Grenoble, France. He is an expert in dust minerology at different evolutionary states of disks, and more in general, he is an expert on transition and debris disks.

Martes 4 de Agosto, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Markus Schoeller, European Southern Observatory, ESO
"Gravity: Observing the Universe in Motion"
GRAVITY is the second generation Very Large Telescope Interferometer instrument for precision narrow-angle astrometry and interferometric imaging. With its fibre-fed integrated optics, wavefront sensors, fringe tracker, beam stabilization and a novel metrology concept, GRAVITY will push the sensitivity and accuracy of astrometry and interferometric imaging far beyond what is offered today. Providing precision astrometry of order 10 microarcseconds, and imaging with 4-milliarcsecond resolution, GRAVITY will revolutionize dynamical measurements of celestial objects: it will probe physics close to the event horizon of the Galactic Center black hole; unambiguously detect and measure the masses of black holes in massive star clusters throughout the Milky Way; uncover the details of mass accretion and jets in young stellar objects and active galactic nuclei; and probe the motion of binary stars, exoplanets and young stellar discs. Gravity has arrived on Paranal in July this year and is currently being reassembled in the New Integration Hall. In a few weeks it will move up into the VLTI laboratory and then undergo a longer and heavy commissioning phase. We aim to offer Gravity for science observations in the spectroimaging mode for October 2016. I will outline the instrument capabilities of GRAVITY and summarize the science opportunities that will open up.

Jueves 6 de Agosto, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Dominik Scleicher,
Dr. Dominik Schleicher, Departamento de Astronomía, Universidad de Concepción, Barrio Universitario, Concepción
"Eclipsing time variations in post-common-envelope systems: Planetary hypothesis vs. Applegate mechanism"
The observed eclipsing time variations in post-common-envelope systems have been proposed as evidence for the presence of planets, while other groups suggest that magnetic activity could lead to similar effects, through a mechanism proposed by Applegate in 1992. We present here an improved version of Applegate`s model and assess whether it can explain the observed eclipsing time variations. We further discuss the potential origin of the planets.

Martes 11 de Agosto, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Johann Olofsson, MPIA, Heidelberg, Alemania
"Dust mineralogy in proto-planetary and debris disks"
The initial conditions of planetary formation are governed by the evolution of initially (sub-) µm-sized silicate dust grains in the early phases of young circumstellar disks. Dust grains are the building blocks of planets (which requires growth spanning over several orders of magnitude), and they provide clues to the dynamical evolution of the disk at all stages of the planet-forming process. Our knowledge about dust, and its evolution, has significantly improved during the past years, thanks to statistical studies at mid- and far-infrared wavelengths based on space-based missions such as Spitzer and Herschel. The mineralogical information (lattice structure, chemical composition, and grain morphology), as determined by spectroscopic observations, provide valuable constraints on the dynamical evolution of disks at various ages (e.g., radial and vertical transport, coagulation, fragmentation, and crystallisation). I will summarize our findings for circumstellar disks at different key steps of the planet-forming process, trying to connect them with our understanding of the solar system.

Martes 18 de Agosto, 2015

Sala Juan Mouat de la Facultad de Ciencias.
Dr. Manuel Aravena, Universidad Diego Portales
"The Evolution of the ISM in Main-Sequence and Starburst Galaxies Across Cosmic Time: Motivation for ALMA Deep Fields"
In the last decade, significant progress has been achieved in the understanding of the evolution of star formation in galaxies as a function of redshift. Its is now clear that the majority of galaxies at z3 form a nearly linear correlation between their stellar mass and star formation rates and appear to create most of their stars in timescales of ~1 Gyr. At the highest luminosities, a significant fractionof galaxies deviate from this 'main-sequence', showing short duty cycles and thus producing most of their stars in a single burst of star formation ('starburst') within a few 100 Myr, being likely driven by major merger activity. Despite the large luminosities of starbursts, main-sequence galaxies appear to dominate the star formation density of the Universe at its peak. While progress has been impressive, a number of questions are still unanswered. In this talk, I will review our current observational understanding of this 'main-sequence' vs 'starburst' galaxy paradigm, and will address how future observations (e.g. with ALMA) will help us to have better insights into the fundamental properties of these galaxies.

""The Evolution of the ISM in Main-Sequence and Starburst Galaxies Across Cosmic Time: Motivation for ALMA Deep Fields ""

Martes 25 de Agosto, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Romain Thomas
""New constraints on galaxy formation and evolution from high redshift galaxy ages ""
Galaxy age is one of the most important physical parameter in galaxy studies. It is also one of the less studied. This is due to the numerous degeneracies that affect its measurement. Studying this parameter for high redshift galaxies allows the limitation of these degeneracies and the production of more reliable galaxy ages measurements. Having this age in hands it becomes possible to study important aspect of galaxy evolution and formation like the epoch of galaxy formation and the mass assembly of galaxies. After a short introduction on the age parameter I will present the largest high redshift spectroscopic galaxy survey, VUDS (Vimos Ultra Deep Survey), which I use for this study. Then I will describe an advanced fitting method that we used to compute galaxy ages and discuss its robustness. I will show the latest constraints on the epoch of galaxy formation by introducing the first measurement of the formation redshift function which measure the galaxy formation history. To finish I will present the first high redshift downsizing measurements. I will conclude and present briefly the future work

Martes 01 de Septiembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dra. Patricia B. Tissera , Astrophysics, Universidad Andres Bello
"Relationship between metallicity gradients and star formation activity in disc galaxies"
The gas-phase metallicity of disc galaxies is the result of the action of different processes such as gas accretion, star formation, chemical evolution, galactic winds, among others. Recent observations have reported correlations between metallicity gradients and stellar mass and between metallicity gradients and specific star formation. We analysed the existence of such correlation in state-of-art cosmological simulations and provided clues to understand them within in the current cosmological paradigm. ""

Martes 08 de Septiembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Mario Soto, Departamento de Fisica Universidad de La Serena, DFULS
""Proper motions in the Galactic Bulge and Multiple Stellar Populations in Globular Clusters using HST"
I will report on two projects currently being carried out at the Space Telescope Science Institute (STScI). The first project studies the proper motions in several low foreground extinction windows of the Galactic bulge. Ten fields have been strategically placed on both ends of the Galactic bar and the Galactic minor-axis allowing for a wide coverage of the kinematics of bulge stars. The second project attempts to characterize the multiple stellar populations patterns in a sample of 55 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, including new results

Martes 22 de Septiembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Arthur Vigan, European Southern Observatory, ESO
"Direct imaging of exoplanets with VLT/SPHERE "I
n the large family of exoplanet detection methods, direct imaging has the strong advantage of providing a measurement of the intrinsic light emitted by young, giant exoplanets. However, detecting these planets is not an

easy task. It relies on a dedicated instrumentation, careful selection of the targets, optimised observing strategy and advanced data analysis methods. Over the past 10 years, a new generation of direct imaging instruments for large, ground-based telescopes has been developed. In Europe, the new exoplanet imager for the Very Large Telescope, SPHERE, has been commissioned at the VLT in 2014 and is now in operation since April 2015. In this seminar, I will first present the scientific context and the basics of direct imaging. Then I will present in more details the SPHERE instrument, and in particular its 3 scientific subsystems: IRDIS, a multi-purpose infrared imager and spectrograph, the IFS, and infrared integral field spectrograph, and ZIMPOL, a visible imager and polarimeter. Finally, I will highlight some of the first results obtained with SPHERE during the commissioning and the science verification"

Viernes 25 de Septiembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dra. Anna Pala, Universidad de Warwick, UK.
"A large HST program: effective temperatures of cataclysmic variable white dwarfs"
While almost 1100 cataclysmic variables (CVs) have published orbital periods (Ritter & Kolb 2013), relatively little is known about their accreting white dwarfs (WDs). The effective temperatures (Teff) of WDs are a direct measure of the accretion rate, averaged over the thermal time scale of their envelopes and hence provides a vital insight into the fundamental properties governing the long-term evolution of CVs. At present, only ~45 systems have reliable Teff (Townsley & Gaensicke 2009). To increase the number of object with an accurate Teff measurement is essential to deepen our knowledge of CV evolution and we have been awarded a large HST program in Cycle 20 (122 orbits, Gaensicke 2012), in which we obtained high-resolution ultraviolet spectroscopy of 40 CV white dwarfs with the Cosmic Origin Spectrograph (COS). I will discuss the observations and data analysis and present results from this large campaign aimed to investigate the physical properties of cataclysmic variables white dwarfs.

Martes 29 de Septiembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Federico Marocco, Universidad de Hertfordshire, UK
"Spectroscopic analysis of a large sample of L and T dwarfs
A comprehensive understanding of sub-stellar objects (brown dwarfs and extrasolar giant planets) and their population characteristics (e.g. IMF, formation history) is only possible through the robust interpretation of ultra-cool objects spectroscopy. However, the physics of ultra-cool atmospheres is complicated by a variety of challenging ingredients (dust properties, non-equilibrium chemistry, molecular opacities). Moreover, while hydrogen-burning stars stabilize on the stellar main-sequence, sub-stellar objects continuously cool down (since they lack an internal source of energy) and evolve towards later spectral types. Their atmospheric parameters are a strong function of age. In this talk I will present the spectroscopic analysis of a large sample of L and T dwarfs, complementing the spectroscopic data with astrometry from the PARSEC program, in order to constrain the sub-stellar initial mass function and formation history. I will then describe our new effort to identify and characterize a large sample of benchmark systems, combining Gaia capabilities with large area near-infrared surveys such as UKIDSS, SDSS, and VVV, in order to calibrate effectively the theoretical models.

Martes 27 de Octubre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Fernando Buitrago, FCT Fellow, Institute for Astrophysics and Space Sciences (IA), Portugal
"Stellar Haloes surrounding Massive Galaxies at z=0.65 or how to use the HUDF for Nearby Universe Studies"
The most massive galaxies in the Universe have attracted lots of attention in the recent years because of their dramatic metamorphosis from being tiny star forming protodisks at high-z to huge quiescent spheroids in the nearby Universe. In order to undergo this transformation they must grow in an inside-out fashion, but cosmological dimming prevents us from a direct test on that scenario because of its strong dependence with redshift - (1+z)^4 -. To this end we have analysed in extreme detail the 6 most massive (Mstellar > 5x10^10 MSun) elliptical galaxies at z < 1 in the HUDF12. Because of the extreme depth of these images and the careful data reduction, we are able to trace the galaxy surface brightness profiles up to the same levels as in the local Universe but at = 0.65 (31 mag arcsec^2 in all 8 HST bands, ~29 mag arcsec^2 restframe or beyond 25 effective radii). This fact enables us to investigate the galactic outskirts or stellar haloes at a previously unexplored era, characterising their light and mass profiles, colors and for the first time the amount of mass in ongoing mergers.

Martes 03 de Noviembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Paco Najarro, Centro de Astrobiología, CSIC-INTA, Spain
"The Massive stellar population at the Galactic Center"

The Galactic center hosts three of the most massive resolved young clusters in the Local Group as well as a large number of apparently isolated massive stars. Therefore, it constitutes a test bed to study the star formation history of the region, to probe a possible top-heavy scenario and to address massive star formation (clusters vs isolation) in a such a dense and harsh environment. We present results from our ongoing infrared spectroscopic studies of the Center of the Milky Way.

Martes 03 de Noviembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. José Prieto, Universidad Diego Portales
"The All-Sky Automated Survey for Supernovae"
The All-Sky Automated Survey for Supernovae (ASAS-SN) is using 14-cm telescopes with wide fields of view in Haleakala (Hawaii) and CTIO (Chile) to observe the whole sky every ~2 days down to V=17 mag searching for transients in real-time. I will describe the survey and the main science drivers, and will highlight some of the most interesting discoveries to date, which include M-dwarf flares, young star outbursts, cataclysmic variables, novae, supernovae, AGN outbursts, and tidal disruption flares.

Martes 24 de Noviembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dra. Lucía Guaita, Osservatorio astronomico di Roma
"The role of gas flows in the escape of Lya photons and galaxy evolution in star-forming galaxies"
Lyman alpha (Lya) emitters (LAEs) provide our best opportunity to study low-mass galaxies experiencing active phases of star formation. They have been detected at any redshift. However, their properties and the morphology of their Lyman alpha emission are not homogeneous. We used a sample of starburst galaxies in the local Universe, the Lyman Alpha Reference Sample (LARS), to study Lya in detail and relate it to rest-frame UV and optical emissions. Every galaxy in the sample that emits Lya does so by producing halos, more extended than UV continuum. Neutral hydrogen distribution and star-formation driven outflows happen to be a necessary condition for the escape of Lya photons. We, also, selected a sample of 2 < z 4 LAEs in field surveys and the sample of the LAEs, narrow-band selected in proto-cluster fields at the same redshifts. Our preliminary results show that the intensity of the Lya emission line is related to the intensity of stellar lines, which represent the galaxy systemic redshift. Measuring the velocity offsets of low-ionization lines with respect to systemic redshift probes outflows due to galactic winds. I will address the role of outflows in the escape of Lya photons and the possible implications to LAE evolution.

Miercoles 25 de Noviembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Eduardo Rojas, Universidad de Antioquia, Medellín, Colombia
"Hadron Spectroscopy in a Schwinger-Dyson-Bethe-Salpeter Approach"
We study ground and radial excitations of flavor singlet and flavored pseudoscalar mesons within the framework of the rainbow-ladder truncation using an infrared massive and finite interaction in agreement with recent results for the gluon-dressing function from lattice QCD and Dyson-Schwinger equations. We find a reasonable description of the ground states and its respective radial excitations.

Martes 01 de Diciembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Fernando Selman, European Southern Observatory, ESO
"Medusas and flying fishes: MUSE dives in Virgo to study IC3418"
It has recently been shown that gas that has been ram-ipressure stripped from galaxies infalling into the hot coronal gas of clusters of galaxies cools and form stars, and their associated HII regions. Proper characterization of these HII regions have not been done, with previous studies limited to detecting the gas and making spectroscopic measurements in a few selected pointings. The tail behind IC3418 is the nearest example of the class and it permits the study of this class of object in an almost HST resolved target. I will present results based on science verification data of the Multi-Unit Spectroscopic Explorer.

Martes 15 de Diciembre, 2015
Sala Juan Mouat de la Facultad de Ciencias.
Dr. Stefan Uttenthaler, University of Vienna, Department of Astrophysics, Austria
" Miras and semi-regular variables with changing pulsation periods "
Miras and semi-regular variables (SRVs) are long-period variables thought to be in the asymptotic giant branch (AGB) phase of evolution. Most of them have pulsation periods of the order of a few hundred days, which are stable over decades to centuries. However, a few objects are known to have changing periods. Three types of pulsation period change have been distinguished in the literature: meandering, continuous, and sudden change. Different causes for the changing periods have been proposed, the most prominent of them is that of a recent helium-shell

flash (also called a thermal pulse, TP) in these stars, which is a powerful ignition of the otherwise dormant He-burning shell. In a publication (Uttenthaler et al. 2011) we studied a sample of Miras and SRVs with changing pulsation periods to clarify their evolutionary state, in particular whether or not these stars are in the thermally-pulsing (TP-)AGB phase, and to elucidate if an ongoing TP could be the cause of the observed period change in one or more of the three change types mentioned before. One important piece of information that was studied to this end is the presence of the radio-active s-process element technetium (Tc), an indicator of a third dredge-up mixing event that follows a TP. Lines of this element were searched for in high-resolution optical spectra of a sample of Miras and SRVs. Also other indicators for the nature and evolutionare state of the sample stars were investigated (abundance of lithium, present-day periods, luminosities). A few very interesting objects that undergo profound changes within a few decades or less are presented in more detail, for example two Miras that probably turned into carbon stars very recently. We suggest that a TP is going on in a few of the sample stars, but other (related) processes might be going on as well.