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SEA

Libro de resúmenes
Abstract book

Galaxias y Cosmología / Galaxies and Cosmology
Sesiones GC1 – GC7 / Sessions GC1 - GC7

Galaxias y Cosmología / Galaxies and Cosmology (GC1)
Lunes 16 de julio / Monday 16 July

15:30	**Mar Mezcua** Observational evidence for intermediate-mass black holes (invitada/invited)
16:00	**Montserrat Villar Martín** The exotic emission line spectra of extremely red BOSS quasars
16.15	**Ignasi Pérez Ràfols** Quasar identification and redshift estimation with SQUEzE
16:30	**Naím Ramírez Olivencia** Sub-arcsecond imaging of Arp 299-A at 150 MHz with LOFAR: Evidence for a starburst-driven outflow
16:45	**Ignacio Martín-Navarro** Black holes and the stellar population properties of galaxies
17:00	**Ignacio Sevilla Noarbe** The Dark Energy Survey project and Data Release 1
17:15	**PÓSTERES**

Observational evidence for intermediate-mass black holes

Mar Mezcua (charla invitada/invited talk)

How supermassive black holes form is still one of the long-standing questions in astronomy. Supermassive black holes of 10ˆ10 solar masses already existed when the Universe was 0.8 Gyr old. To reach this mass in such a short time, they should have started as seed intermediate-mass black holes (IMBHs) of 100-10ˆ5 Msun. The presence of IMBHs at z>7 is difficult to prove; however, those seed IMBHs that did not grow into supermassive black holes should be found in local dwarf galaxies resembling the first galaxies formed at early epochs.

I will present observational evidence that a population of IMBHs exists in dwarf galaxies based on the X-ray stacking analysis of low-mass galaxies in the Chandra COSMOS-Legacy survey and on the finding of AGN X-ray emission in 40 dwarf galaxies at redshifts <~2. One of the dwarf galaxies has a stellar mass of ~7e7 Msun and is the least massive galaxy found so far to host an AGN. Unlike massive galaxies, the AGN fraction of low-mass galaxies is found to decrease with redshift, suggesting that AGN in dwarf galaxies evolve differently than those in high-mass galaxies.

The exotic emission line spectra of extremely red BOSS quasars

Montserrat Villar Martín, Andrew Humphrey, Luc Binette

A population of quasars with extremely red infrared-to-optical colours (ERQ) has been recently identified in BOSS, having z~1.5-5.0. They are possible candidate young objects in a transition phase of massive galaxy evolution. They show peculiar UV rest frame emission line spectra. Based on AGN photoionization models we have constrained the densities, metallicities and sizes of the ionized regions responsible for the exotic spectra in 4 ERQ at z~2.5. They are specially interesting because they show extreme ionized outflows identified in the [OIII] optical lines. The results of our models have relevant implications regarding the outflow energetics and the potential impact on the host galaxies.

Quasar identification and redshift estimation with SQUEzE

Ignasi Pérez Ràfols, Matthew Pieri, Michael Blomqvist,
Sean Morrison, Debopam Som

Previous surveys such as BOSS have relied on a visual inspection of all quasars to estimate their redshift and to provide with catalogues with high levels of purity. This is a task that will not be possible as datasets grow larger and larger so we need to provide with an automatic way to reliably detect these objects and correctly estimate their redshift.

In this context we present the software SQUEzE, which is specifically designed to identify quasars and estimate their redshift and is easily adaptable to target either purity or completeness. We will present the first results of applying this code to BOSS quasar targets and compare it with the visually inspected quasar catalogue.

Sub-arcsecond imaging of Arp 299-A at 150 MHz with LOFAR: Evidence for a starburst-driven outflow

Naím Ramírez Olivencia, E. Varenius, M.A. Pérez Torres, A. Alberdi, E. Pérez, A. Alonso Herrero, A. Deller, R. Herrero Illana, J. Moldón, L. Barcos Muñoz, I. Martí Vidal

A galaxy merger might trigger a high star formation burst in the central kpc of the interacting galaxies, and/or awake their Active Galactic Nuclei (AGN). In both cases, this can also lead to the formation of powerful outflowing winds. However, very few nuclear winds have been observed in the local universe.

We present subarcsecond (~0.4") angular resolution observations at 150 MHz of the galaxy merger Arp 299, the brightest and nearby Luminous Infrared Galaxy (LIRG) within 50 Mpc, obtained with the LOw Frequency ARray Telescope (LOFAR). These are the deepest and highest angular resolution observations of Arp299 ever obtained at such a low frequency, and show for the first time unambiguous evidence for the existence of a powerful, ~5 kpc-large outflow in one of its nucleus, Arp 299A. This nucleus is known to host a prolific supernova factory, as well as a Low-Luminosity AGN. From energetic arguments, we conclude that the outflow must be driven by the powerful starburst at the center of Arp299A. This finding is confirmed also by [FeII] and H2 imaging obtained with the HST/NICMOS, which shows similar structures of ionized gas. The estimated age of the outflow is (3-7) Myr, its mass-loss rate of (11-63) M_sun/yr, and its outflowing speed is (400-900) km/s.

Our work was selected by A&A as a Highlight in its March issue, and shows that LOFAR might be an extremely useful tool to discover many more unveiled outflows in local star-forming galaxies and/or nuclei.

Black holes and the stellar population properties of galaxies

Ignacio Martín-Navarro

Black holes are a fundamental ingredient in our current understanding of galaxy formation. In the absence of their feedback, state-of-the-art numerical simulations fail to match the observed properties of massive galaxies. Effectively, within a Lambda Cold Dark Matter Universe, black holes reconcile cosmology and galaxy formation theories by regulating baryonic processes. However, despite this widely-accepted and fundamental role, evidence of black hole regulated star formation remains elusive.

I will present our observational efforts to characterize and understand the interplay between black hole activity and star formation, based on detailed stellar populations analyses. Our observations show that black hole and stellar population properties are tightly related, calling for a rich and complex observational framework where star formation, black holes, and chemical enrichment evolve coupled in time.

The Dark Energy Survey project and Data Release 1

Ignacio Sevilla Noarbe and The Dark Energy Survey Collaboration

The Dark Energy Survey is a major international effort to pin down the nature of dark energy by performing a photometric survey of the southern sky, covering 5000 square degrees up to magnitude i = 23.7 and doing a repeat, deep scan of 27 square degrees to identify and accumulate type Ia supernovae. However, this vast and rich dataset (almost 400 million objects) can be also used to do many other interesting galactic and extragalactic astrophysics analyses, such as searches for local dwarf galaxies, transneptunian objects or optical counterparts of gravitational wave events, some of which will be highlighted here. The first data release of the project DR1, encompassing the first three years of the project, is also presented for the community to explore and exploit.

Galaxias y Cosmología / Galaxies and Cosmology (GC2)
Martes 17 de julio / Tuesday 17 July

9:00	**Cárlos López Sanjuan** J-PLUS DR1: 1000 squared degrees in twelve optical bands (invitada/invited)
9:30	**Rubén García-Benito** Spatially-resolved color--mass-to-light ratio relations in the CALIFA survey
9:45	**Bruno Rodríguez del Pino** Incidence and properties of ionized outflows in MaNGA DR2 galaxies
10:00	**Katarzyna Bensch** The role of photoionization models of HII regions of dwarf galaxies in understanding galaxy evolution
10:15	**Patricia Sánchez-Blázquez** Gas and stellar metallicity gradients in face-on disk galaxies
10:30	**Susana Planelles** Multi-frequency synthetic observations (of the WHIM) in a simulated galaxy cluster
10:45	**PÓSTERES**

J-PLUS DR1 : 1000 sq deg in twelve optical bands

Carlos López Sanjuan on behalf of the J-PLUS collaboration
(charla invitada /invited talk)

We proudly present the first public data release of J-PLUS (Javalambre - Photometric Local Universe Survey). J-PLUS is being conducted with the JAST/T80 telescope at OAJ (Observatorio Astrofísico de Javalambre) in Teruel, Spain. The instrument T80Cam observes 2 squared degrees per pointing and scans the Northern sky with 5 broad (ugriz) and 7 narrow-band filters (including [OII] and Halpha rest-frame).

The J-PLUS DR1 comprises ~500 pointings (1000 squared degress) fully reduced and calibrated. We will present the main DR1 properties (footprint, FWHM, limiting magnitudes) and highlight some science cases, focusing on the extragalactic ones (2% photometric redshifts at r < 20, 2D star formation rate, 2D stellar populations, environmental studies, etc).

The web front access to the data and the ADQL protocols will be also presented.

Spatially-resolved color-mass-to-light ratio relations in the CALIFA survey

Rubén García-Benito, Rosa González Delgado,
Enrique Pérez Jiménez, Roberto Cid Fernandes

We investigate the mass-to-light versus colors relations (MLCRs) derived from the spatially-resolved star formation history (SFH) of nearly 500 galaxies observed with integral field spectroscopy in the CALIFA survey. Our method combines the full spectral fitting with different sets of stellar populations models to derive the stellar mass and the stellar mass surface density with observed and synthetic colors in optical broad bands. This method allows to get the radial structure of the mass-to-light ratio (M/L) for different bands, and their gradients, and to study the spatially-resolved MLCRs.

Incidence and properties of ionized outflows in MaNGA DR2 galaxies

Bruno Rodríguez Del Pino, Santiago Arribas

Feedback originated from star formation and AGN activity in galaxies can have a significant impact on their evolution. The action of feedback leads to several processes that might have a significant effect on the surrounding gas, for example by heating the system, halting or enhancing star formation, or enriching the interstellar medium. Constraining the incidence and properties of feedback events such as ionized outflows is therefore crucial to understand galaxy evolution. In this talk I will present the results from a thorough search and characterization of ionized outflows in a large number of nearby galaxies ($z<0.1$) hosting star formation and AGN activity.

The sample of galaxies is taken from the Second Data Release of the MaNGA Integral Field Spectroscopic survey, which contains more than 2700 individual objects. Benefitting from the wide spatial coverage of the MaNGA data we isolate the regions hosting star formation and AGN activity and perform a detailed modelling of their spectra around the Halpha line, aiming to identify gas at high velocities associated with ionized outflows.

As a result of our analysis we find evidence for ionized outflows in more than 100 regions hosting star formation or AGN activity. Interestingly, several of them show maximum velocities in the ionized gas of the same order of those found in local ULIRG/s, but with star formation rates (SFRs) a factor of ~100 lower. We also show that ionized outflows are observed in regions with SFRs down to 0.15 Msun/yr and that the kinematics of the ionized gas do not strongly depend on the associated SFRs.

Our results provide interesting clues about the role played by ionized outflows in relatively small regions (< 1 kpc) serving as a baseline to understand outflows at larger scales.

The role of photoionization models of HII regions of dwarf galaxies in understanding galaxy evolution

Katarzyna Bensch, Luca Izzo, Christina Thöne,
Antonio de Ugarte Postigo, David Nicholls, Lisa Kewley

Star-formation has a direct influence on chemical abundances of galaxies. Gas-rich dwarf irregular galaxies (DIGs) are less chemically evolved and therefore are great laboratories for detailed studies of chemical evolution. Their star-formation histories are simpler than those of massive galaxies. Especially isolated DIGs are important sources for understanding star-formation. They have been formed and evolve far from dense cluster centres and the gravitational influences of massive companions. The isolation allows us to study star-formation that originates purely from evolutionary processes of the pristine IGM in galaxy environments. We use Integral Field data to study 7 metal-poor DIGs with VLT/VIMOS and 13 isolated gas-rich DIGs from the SIGRID sample obtained with WiFeS. The H II emission suggests ongoing star-formation for the past 5 Myr. Metallicity estimates for HII regions of DIGs are one of the most important tools towards an understanding of galaxy evolution since those studies require a precise metallicity calibration.

We derive theoretical models using the MAPPINGS photoionization modelling code to predict theoretical emission line ratios at different values of metallicity and ionization parameters. The detection of multiple emission lines of H, O, N, Ne, He, S, and Fe allows us to use and compare different line-ratio grids to study the metallicity of the different HII regions. We investigate their resolved chemical composition, paying special attention to the metallicity-age connection. We discuss the problems arising from the limitations of simple geometric models and depletion of elements onto dust. The spatially resolved star formation history is consistent with the predictions from the models over the several hundred milion years.

Gas and stellar metallicity gradients in face-on disk galaxies

Patricia Sánchez-Blázquez, S. Sánchez, J. Falcón-Barroso, J. Méndez-Abreu

I will present an analysis of the metallicity gradients in a sample of 200 disk galaxies from the CALIFA survey. The metallicity gradient of both the stellar and the gas-phase component will be compared as well as their correlation with other parameters, like mass, morphological type, presence of bar, type of spiral arms and gas fraction. I will also present the correlations with both, the age and [Mg/Fe] gradients for the stellar components. This analysis allow us to conclude about the evolution of the metallicity gradients with time as well as the influence of axis-symmetric features in producing radial migration.

Multi-frequency synthetic observations (of the WHIM) in a simulated galaxy cluster

Susana Planelles, Petar Mimica, Vicent Quilis

In the local Universe, about 50 per cent of the expected cosmic baryon content is "missing". While hydrodynamical simulations suggest that most of the missing baryons could be found in the warm-hot intergalactic medium (WHIM), the relatively low temperature and density of this gas phase make it quite challenging to be observed at most wavelengths. In this contribution, we show multi-frequency mock observations of a rich galaxy cluster developed in a full Eulerian-AMR cosmological simulation. In order to obtain these mock observations, the outputs of the simulation are analysed with a full-radiative transfer code that allows to compute the change of the intensity at any frequency along the null-geodesic of photons.

In this analysis we compare the emission from the WHIM, i.e. the gas with a temperature within 10^5-10^7 K, and from the whole inter-galactic medium (IGM). In particular, we compare their corresponding emissions at three observational bands, namely those associated to thermal X-rays, thermal and kinematic Sunyaev-Zel'dovich effect and radio. With our novel procedure, we generate synthetic WHIM and IGM maps which could be easily compared with existing and forthcoming multi-wavelength observational images of these gas components. Overall, our high-resolution galaxy cluster shows multi-frequency emissions in broad agreement with previous simulated and observational estimates of both gas components.

Galaxias y Cosmología / Galaxies and Cosmology (GC3)
Martes 17 de julio / Tuesday 17 July

15:30	**Christina Thöne** GRB & SN hosts in 3D
15:45	**Mónica Vázquez Acosta** Studies of the Extragalactic Background Light with the MAGIC telescopes
16:00	**Carlos Palenzuela Luque** Gravitational waves from compact binary mergers
16.15	**Antonio de Ugarte Postigo** SN2017iuk: A new standard in the GRB-SN field
16:30	**Nicola Bellomo** The origin of progenitors in merging black hole binaries
16:45	**José Luis Bernal** Signatures of primordial black holes as seeds of supermassive black holes
17:00	**Miriam Cabero Muller** Observational tests of the black hole area increase law
17:15	**PÓSTERES**

GRB & SN hosts in 3D

Christina Thöne, Luca Izzo, Steve Schulze

Massive stars are connected to highly star-forming environments and galaxies, and hence are their explosive deaths. Gamma-ray bursts (GRBs) and superluminous supernovae (SLSNe) are the most luminous of those stellar explosions. Both classes of objects are hosted in starburst galaxies with low metallicities and young stellar populations, which, at redshifts below 1-2 are mostly dwarf galaxies. Integral field data now allow us to study the most nearby and brightest of them with resolved spectroscopy. We will present a sample of GRB and SLSN hosts observed with FLAMES and MUSE to study their spatially resolved abundances, star-formation and kinematics.

GRBs are usually found in regions with low metallicity and high star-formation rate, but not at the site with the most extreme properties. In fact, most are located at the edge of the most extreme region in their host. The kinematics of these galaxies mostly do not show evidence for SF triggers due to major interactions or merger. However, we do find evidences for outflows from these galaxies, underlining the extreme SF activity.

We also present the curious case of a seemingly solar metallicity SLSN host and SLSN environment, where star-formation history modeling reveals the contribution of a young low-metallicity population, the likely origin of the SLSN progenitor. This shows that detailed 3D studies are crucial, not only for the hosts of massive stellar explosions but for understanding the star-formation history and triggers of dwarf galaxies in general.

Studies of the Extragalactic Background Light with the MAGIC telescopes

Mónica Vázquez Acosta

A measurement of the Extragalactic Background Light (EBL) from a combined likelihood analysis of blazar spectra detected by the MAGIC Telescopes is presented. EBL is the optical-infrared diffuse background light accumulated during the history of the Universe, directly emitted (mostly) by stars or reprocessed by dust, providing unique information about the history of galaxy formation. The low energy photons from EBL interact with very high energy photons from blazars, leaving an energy-dependent imprint on their gamma-ray spectra.The study of the spectra can be used to constrain the EBL density at different wavelengths and its evolution in time. The spectra of 12 blazars in the redshift range z=0.03 to z=0.94, are used to improve previous constraints on EBL by MAGIC. Novel results on the EBL evolution with time will be presented. Combined spectra of Fermi-LAT and MAGIC data are also used to extract wavelength-resolved EBL measurements.

Gravitational waves from compact binary mergers

Carlos Palenzuela Luque, Miguel Bezares, Daniele Vigano

The direct detection of gravitational waves through interferometric observatories opens a new window to study some of the most energetic phenomena occurring in the Universe. In particular, the recent observation of concurrent observations of gravitational and electromagnetic (EM) waves produced by the coalescence of binary neutron stars starts a new era of multimessenger astronomy that will enhance our understanding on the parameters of the system and the physical processes at play, allowing us to test our theories and validate our astrophysical models.

In this talk I will present our studies of the dynamics of the binary neutron star coalescence and other exotic compact objects, through advanced numerical simulations, by solving the general relativistic magnetohydrodynamics equations. We also estimate the radiation that these systems emit in the different bands (i.e., electromagnetic, gravitational and neutrinos).

SN2017iuk: A new standard in the GRB-SN field

Antonio de Ugarte Postigo, Luca Izzo, David Alexander Kann,
Christina Thöne, Katarzyna Bensch

SN2017iuk is the supernova associated to GRB 171205A, the 3rd closest GRB-SN ever detected, at a redshift of z=0.0368. Here we present the follow-up campaign led by the HETH group at the IAA-CSIC on behalf or a world wide collaboration. Our observations include extensive follow-up with OSIRIS/GTC, X-shooter/VLT, ALMA, GMRT and HST. This is one of the most densely sampled GRB-SN to date. The early OSIRIS spectra displayed the earliest ever detection of supernova features associated to a GRB-SN and the highest velocity ones. Our ALMA observations show the first resolved map of a GRB host galaxy in CO emission, with a similar spatial resolution to our HST images. In this talk I will give an overview of this exceptional event and put it into context of the GRB-SNe currently known.

The origin of progenitors in merging black hole binaries

Nicola Bellomo

The detection of gravitational waves from merging black holes opened a new era in astronomy and cosmology, providing a new tool to explore the cosmos. However, after the first two runs of LIGO, it seems that a significant fraction of detected progenitors of such binary systems has an unexpected large mass. This fact triggered a large discussion about the possible origin of so massive black holes, in particular it was suggested that it could be primordial and that they could form a significant fraction of the dark matter. According to this hypothesis, black holes mergers are most probable in low mass halos, where the binary formation is most likely to happen. On the other hand, if they have formed at the end of stellar evolution, they are more likely to be found in high mass halos. In this talk I present a possible way to determine their origin in a statistical way, by cross correlating galaxies catalogs and gravitational waves maps. Since low and high mass halos exhibit different properties, e.g. different bias, by determining this quantity we can infer the origin of the progenitors. We forecast the possibility for future cosmological surveys to do so.

Signatures of primordial black holes as seeds of supermassive black holes

José Luis Bernal, Alvise Raccanelli, Licia Verde, Joseph Silk

It is broadly accepted that Supermassive Black Holes (SMBHs) are located in the centers of most massive galaxies, although there is still no convincing scenario for the origin of their massive seeds. It has been suggested that primordial black holes (PBHs) more massive than 10ˆ2 solar masses may provide such seeds, which would grow to become SMBHs.

We suggest an observational test to constrain this hypothesis: gas accretion around PBHs during the cosmic dark ages powers the emission of high energy photons which would modify the spin temperature as measured by 21cm Intensity Mapping (IM) observations.

We model and compute their contribution to the standard sky-averaged signal and power spectrum of 21cm IM, accounting for its substructure and angular dependence for the first time.

If PBHs exist, the sky-averaged 21cm IM signal in absorption would be higher, while we expect an increase in the power spectrum for l >~ 100-1000. We also forecast PBH detectability and measurement errors in the abundance and Eddington ratios for different fiducial parameter configurations for various future experiments, ranging from SKA to a futuristic radio array on the dark side of the Moon. While the SKA could provide a detection, only a more ambitious experiment would provide accurate measurements.

Observational tests of the black hole area increase law

Miriam Cabero Muller

In a binary black hole coalescence where two black holes merge together, the black hole area theorem implies that the area of the final black hole should be greater than the sum of the areas of the two original black holes. Observations of gravitational waves from binary black hole coalescences provide the opportunity of testing the area theorem using observational data. The inspiral (ringdown) part of the waveform provides a measurement of the initial (final) parameters of the black holes. These measurements will, for the first time, allow us to observationally check the validity of the second law of black hole thermodynamics in binary black hole merger events.

Galaxias y Cosmología / Galaxies and Cosmology (GC4)
Miércoles 18 de julio / Wednesday 18 July

9:00	**Ignacio Trujillo** Hunting in the darkness: the adventure of unveiling the low surface brightness Universe (invitada/invited)
9:30	**Arianna di Cintio** Ultra diffuse galaxies: a formation scenario
9:45	**Raffaella Anna Marino** Dark Galaxy candidates at redshift ~ 3.5 detected with MUSE
10:00	**Sébastien Comerón** The rotation curves of thin and thick discs from local edge-on galaxies as seen with MUSE
10:15	**Isabel Santos Santos** Understanding the emergence of a plane of satellites around the MW
10:30	**Jose Oñorbe** What do we know about HI Reionization? New Constraints from the high-z Lyman-alpha Forest
10:45	**PÓSTERES**

Hunting in the darkness: the adventure of unveiling the low surface brightness Universe

Ignacio Trujillo (charla invitada/invited talk)

From the beginning of time mankind has wondered what lies behind the darkness of the night sky. From the pre-telescope era to the present, our ability to see the lowest surface brightness details in the sky has improved by a factor of one million. In this talk I describe how our vision of the sky has changed over time and how the recent developments in ultra deep imaging have speed up our capacity to discover new objects and structures in the sky.

Ultra diffuse galaxies: a formation scenario

Arianna di Cintio

A large number of Ultra-Diffuse Galaxies (UDGs) has been detected over the past few years, both in clusters and in isolation. UDGs have stellar masses typical of dwarf galaxies but effective radii of Milky Way-sized objects, and their origin remains puzzling. Using hydrodynamical zoom-in simulations from the NIHAO project we show that UDGs form naturally in dwarf-mass haloes, as a result of episodic gas outflows associated with star formation. The simulated UDGs live in isolated haloes of masses 10^{10}-10^{11} Msun, have stellar masses of 10^{7}-$10^{8.5}$ Msun, effective radii larger than 1 kpc and dark matter cores. Remarkably, they have a non-negligible HI gas mass of 10^{7}-10^{9} Msun, which correlates with the extent of the galaxy.Gas availability is crucial to the internal processes that form UDGs: feedback driven gas outflows, and subsequent dark matter and stellar expansion, are the key to reproduce faint, yet unusually extended, galaxies. This scenario implies that UDGs represent a dwarf population of low surface brightness galaxies and that they should exist in the field. Several predictions and comparisons with stat-of-the-art observational data will be presented. Amongst other, we will show that the largest isolated UDGs sistematically contain more HI gas than less extended dwarfs of similar M*, corroborating our proposed formation scenario.

Dark Galaxy candidates at redshift ~ 3.5 detected with MUSE

Raffaella Anna Marino, S. Cantalupo, S. J. Lilly, S.G. Gallego, L. A. Straka et al.

Recent theoretical models suggest that the early phase of galaxy formation could involve an epoch when galaxies are gas-rich but inefficient at forming stars: a “dark galaxy” phase. Here, I will present the results of our MUSE (Multi Unit Spectroscopic Explorer) survey for dark galaxies fluorescently illuminated by quasars at z > 3. Compared to previous studies which are based on deep narrow-band (NB) imaging, our integral field survey provides a nearly uniform sensitivity coverage over a large volume in redshift space around the quasars as well as full spectral information at each location. By comparing the rest-frame equivalent width (EW0) distributions of the Ly alpha sources detected in proximity to the quasars and in control samples, we detect a clear correlation between the locations of high EW0 objects and the quasars. This correlation is not seen in other properties such as Ly alpha luminosities or volume overdensities, suggesting the possible fluorescent nature of at least some of these objects. Among these, we find 6 sources without continuum counterparts and EW0 limits larger than 240 Å that are the best candidates for dark galaxies in our survey at z ~ 3.5.

The rotation curves of thin and thick discs from local edge-on galaxies as seen with MUSE

Sébastien Comerón

Thick discs are nearly ubiquitous components of the discs of present-day galaxies. They have a larger scale-height and a lower surface-brightness than their thin counterparts. Their formation mechanism has been debated in the literature. It has been proposed that a fraction of their stars has been accreted.

To test whether the above hypothesis holds true for a large fraction of the thick disc stars, we observed a sample of eight nearby edge-on galaxies with the MUSE integral field unit at the VLT.

We built thick disc rotation curves for the observed galaxies. None of them shows evidence for large amounts of retrograde stars. Accounting for those found in the literature, there are twenty available thick disc rotation curves, with only one showing clear signatures from retrograde material.

Based on literature numerical studies on dynamical friction, we estimate that at the current cosmic time one in six mergers for which the stars of the accreted galaxy ended in a thick disc were retrograde. This is in at least a two sigma tension with the observed 1/20 fraction of galaxies with thick disc retrograde material. Therefore, an accretion origin as the main thick disc formation mechanism is not favoured by observations.

Understanding the emergence of a plane of satellites around the MW

Isabel Santos-Santos, Rosa Domínguez-Tenreiro, Chris Brook,
Héctor Artal, Patricia Tissera, Susana Pedrosa, Lucas Bignone,
M. Ángeles Gomez-Flechoso, Arturo Serna

Most of the satellites of the Milky Way and Andromeda galaxies occupy a narrow, elongated region across the sky as if located on a plane. Recent studies have suggested similar alignments in other galactic systems beyond the Local Group, like CenA. In the case of the MW -for which reliable phase-space data is available-, the plane consists of the 11 brightest satellites, it is almost perpendicular to the MW's disk, and ~6-8 out of 11 show coherent kinematics as if their orbits were contained within the plane.

Such an extremely anisotropic distribution of satellites is rare to reproduce within DM-only cosmological simulations, despite the preferential accretion of substructures onto halos through the filaments of the cosmic web. Subsequent studies using high resolution hydrodynamical simulations of MW-type galaxies have shown that the inclusion of baryonic physics plays a crucial role, however the few studies on this issue have not been able to recover planes of satellites with as high significance and kinematical coherence as the one observed around the MW.

We have explored this problem with a set of high-resolution zoom-in cosmological hydro-simulations of disk galaxies, run with different codes and subgrid-physics implementations. All of them present a clear non-random distribution of their satellites, which we follow as it evolves with cosmic time. By looking at the Aitoff projection of their orbital poles, and through careful statistical analyses, we identify sets of satellites with coherent kinematics to which we fit planes of small minor-to-major axis ratio, very often either polar or in the disk plane. We find that both the fraction of satellites belonging to outstanding planes and its thickness (i.e, the plane significance) change with time, and that planes are not always long-lasting. We search for the physical processes driving these changes and the persistence of satellites planes. A clue may reside in the merger/assembly history of disk+satellites systems as well as in disk secular instability processes.

What do we know about HI Reionization? New Constraints from the high-z Lyman-alpha Forest

José Oñorbe

How and when the first luminous sources reionized diffuse baryons in the intergalactic medium (IGM) is one of the most fundamental open questions in cosmology. I will show that even after reionization is complete, its thermal vestiges persist in the IGM to much later times. Therefore by measuring the thermal state of the IGM from the statistics of the high-z (z~5-6) Lyman-alpha forest, we can place constraints on reionization. I will show results from hydrodynamical simulations that make use of a new method to generate self-consistent inhomogeneous thermal and reionization histories.

This new methodology allows us to study in detail the effect of these different histories in the Lyman-alpha forest. I will present the first direct constraints on when HI reionization happened and how much energy per atom was injected into the IGM using the flux power spectrum of high resolution quasar spectra at z>5. I will discuss the different degeneracies of this measurement and I will show that by studying the Lyman-alpha flux power spectrum of high resolution quasar spectra at z~5-6, we should be able to put also interesting constraints on the intensity of primordial magnetic fields and dark matter properties.

Galaxias y Cosmología / Galaxies and Cosmology (GC5)
Miércoles 18 de julio / Wednesday 18 July

15:30	**Helmut Dannerbauer** Witnessing the build-up of distant galaxy clusters in the (sub)millimeter regime (invitada/invited)
16:00	**Ana Paulino-Afonso** The role of mass and environment in galaxy evolution at z~1
16:15	**Javier Álvarez-Márquez** Panchromatic view of Lyman Break Galaxies at z~3
16:30	**David Martínez Delgado** Stellar Tidal Streams in the local Universe
16:45	**Gonzalo Vllella Rojo** The Star Formation Rate of the Local Universe with J-PLUS survey Data
17:00	**Benito Marcote** Unveiling the origin of Fast Radio Bursts by localizing the only repeating source
17.15	**PÓSTERES**

Witnessing the Build-Up of Distant Galaxy Clusters in the (Sub)Millimeter Regime

Helmut Dannerbauer (charla invitada/invited talk)

In order to understand galaxy formation it is crucial to obtain sensitive observations of the emission of dust which constrains the bolometric luminosity and the molecular gas content which constrains the on-going star formation or AGN activity and the future potential of the galaxy to grow. Constraining the growth of ensemble of galaxies in the distant universe is one of the primary goals of current and planned (sub)mm facilities such as ALMA or SPICA. Galaxies in local clusters are significantly affected by environmental effects. However, we do not yet know when these physical processes are initiated and what mechanisms in clusters directly impact the course of galaxy evolution. I will present our extensive on-going observations of the cold interstellar medium of a galaxy cluster in formation at z=2.2 with ALMA and the Australian Telescope Compact Array. The presented study enables us to investigate the environmental dependency of the amount of cold molecular gas, the star formation efficiency and the formation of elliptical galaxies which dominate local galaxy clusters.

The role of mass and environment in galaxy evolution at z~1

Ana Paulino-Afonso, David Sobral, Behnam Darvish, Bruno Ribeiro, Andra Stroe, Philip Best, José Afonso, Yuichi Matsuda

The VIMOS Spectroscopic Survey of a Supercluster in the COSMOS field (VIS3COS) aims to accurately map in 3D a superstructure at 0.8<z<0.9, which contains 3 massive X-rays confirmed clusters and shows a striking filamentary structure in the HiZELS Ha survey at z=0.84 (Sobral et al. 2011). The ~500 spectroscopic members probe a wide range of densities and environments (from fields to the cluster outskirts/rich groups). I will present this survey (Paulino-Afonso et al., accepted for publication on A&A) and our efforts to detail and understand the mass-environment relation, the nature of post-starburst galaxies and the role of mergers (Paulino-Afonso et al., submitted to A&A). Mass or environment: which plays the key role? Can we witness the transformation of the blue sequence into the red sequence? If so, where is it more prominent: in the filaments, groups or clusters? Is this transformation also being encoded in the galaxy morphology? And what is happening to the interstellar medium pressure (or electron density)? Do we still have an evidence for an environmental dependence of the electron density as reported by Darvish et al. (2015) at z~1 and when we probe a wide range of overdensities and different mass regimes?

Panchromatic view of Lyman Break Galaxies at z~3

Javier Álvarez-Márquez, Denis Burgarella

We have explored, from a statistical point of view, the UV-to- Radio properties of a large sample of Lyman Break Galaxies (LBGs) at z ~ 3. Our sample includes 20 000 LBGs in the redshift range, 2.5 < z < 3.5, and it has been selected by using the classical dropout technique (Steidel et al. 1996) in the COSMOS field. The large number of galaxies included in the sample allowed us to split it in several bins as a function of UV luminosity (L_FUV), UV continuum slope (β_UV) and stellar mass (M_star), which gives the possibility to study in more detail the variety of the sample.

We have performed a stacking analysis in PACS (100 and 160 μm), SPIRE (250, 350 and 500 μm) and AzTEC (1.1 mm) bands. This has allowed us to constrain the full infrared spectral energy distribution (SED) and to derive the average IR luminosity as a function of L_FUV, β_UV, and M_star. By using the IR to UV luminosity ratio (IRX) we have studied the evolution of their dust attenuation. We have also estimated the average relation between the total star-formation rate (SFR) M_star, which shows that our LBG sample lies on the main sequence of star formation at z ~ 3. These results allow a direct estimation of the average dust attenuation of main sequence star-forming galaxies at z ~ 3, providing an empirical calibration to derive the dust attenuation in high-z galaxies.

We have then extended the previous analysis to the rest-frame UV-to-FIR spectrum domain. We have computed the full rest-frame UV-to-FIR mean SED as a function of L_FUV, β_UV, and M_star, by applying a complementary stacking analysis to the Optical/NIR, IRAC, and MIPS observations. We have focused here on the investigation of the mean physical properties of the LBG population (SFH, age, dust attenuation law, M_star, M_dust), by employing semi-empirical spectral synthesis techniques. This work also provides the community empirical rest-frame UV-to-FIR templates of "normal" star-forming galaxies at z~3.

Stellar Tidal Streams in the local Universe

David Martínez-Delgado

I present the first results of a comprehensive survey of stellar tidal streams in a selected sample of Milky-Way analog galaxies in the local universe (for distance $z<0.02$), taking advantage of the ultra-deep, wide-field data provided by robotic amateur telescopes and ultra-deep imaging from the new generation deep imaging surveys. This survey will contribute to estimate the incidence, size/geometry and stellar luminosity/mass distribution of the stellar streams in the Local Volume. The final sample of streams will also provide the first extensive statistical basis that can be compared with state-of-the-art, self-consistent Lambda-CDM cosmological simulations of this phenomenon.

We expect the results of this project will provide a direct and stringent test of hierarchical structure formation on this small scale, constrain the present-epoch (minor) interaction rate and probe the minor-merger resilience of stellar disks.

The Star Formation Rate of the Local Universe with J-PLUS survey Data

Gonzalo Vilella-Rojo, Carlos López Sanjuan, Kerttu Viironen, Jesús Varela López

The J-PLUS survey has already covered more than 1000 squared degrees of the northern sky with a set of 12 filters: 5 broadband filters, in commmon with SDSS ugriz, and a set of 7 narrow or intermediate bands. One of these narrow filters is located in the rest-frame emission of the Hydrogen Alpha line, which is a well known star formation rate tracer, as its presence is mostly due to massive newborn stars. This line is within the filter range up to $z<0.015$. To obtain the Star Formation Rate Density of the local Universe, surveys that cover large areas are required to compensate the shallowness in distance. In this regard, J-PLUS is an exceptional survey.

In this talk I will present the first determination of the Halpha Luminosity Function of the local Universe with J-PLUS data.

Unveiling the origin of Fast Radio Bursts by localizing the only repeating source

Benito Marcote

Fast Radio Bursts (FRBs) are transient sources that emit a single radio pulse with a duration of only a few milliseconds. They were firstly discovered ten years ago, and nowadays we have detected tens of these events. However, their physical origin remains unclear, and a number of scenarios even larger than the number of known FRBs has been proposed during these years.

The detection of multiple bursts in FRB 121102 excluded all the cataclysmic scenarios, at least for this particular FRB. The presence of these repeating bursts allowed us to perform a precise localization of the source with the Karl G. Jansky Very Large Array (VLA) and the European VLBI Network (EVN). Optical observations with Keck, Gemini and HST unveiled the host to be a low-metallicity star-forming dwarf galaxy located at a redshift of 0.193. The EVN results showed that the bursts are co-located (within a projected separation of < 40 pc) to a compact and persistent radio source with a size of 0.7 pc and located within a star-forming region.

This environment resembles the ones where superluminous supernovae or long-duration gamma-ray bursts are produced. Although the nature of this persistent source and the origin of the bursts remain unknown, the scenarios considering a neutron star/magnetar energizing a young superluminous supernova, or a system with a pulsar/magnetar in the vicinity of a massive black hole are the most plausible ones to date.

More recent observations have shown that the bursts from FRB 121102 are almost 100% linearly polarized at an unexpectedly high and variable Faraday rotation measure, that had been observed to date only in vicinities of massive/supermassive black holes. The bursts are thus likely produced from a neutron star in such environment, although the system can still be explained by a young neutron star embedded in a highly magnetized pulsar wind nebula or supernova remnant.

Galaxias y Cosmología / Galaxies and Cosmology (GC6)
Jueves 19 de julio / Thursday 19 July

9:00	**Ángel Bongiovanni** The OTELO survey (invitada)
9:30	**Antonio Ferragamo** Sunyaev-Zeldovich vs dynamical masses. Scaling relations using optical follow-up of Planck SZ sources
9:45	**Jesús Vega Ferrero** The Hubble Constant from SN Refsdal
10:00	**Ricardo Génova Santos** High-significance detection of the relativistic Sunyaev-Zel'dovich effect using Planck data
10:15	**Oliver Díaz Rodríguez** Calibrating the galaxy color redshift relation for Euclid and mapping the star formation main sequence
10:30	**Miguel Pérez Torres** A dust-enshrouded tidal disruption event with a resolved radio jet in a galaxy merger
10:45	**Carlos Hernández Monteagudo** Angular Redshift Fluctuations: A New Cosmological Probe

The OTELO Survey

Angel Bongiovanni, OTELO Team

The evolution of galaxies across the cosmic time is observationally studied by means of extragalactic surveys that cover significant volumes of Universe, with a wealth of multiple-wavelength ancillary data. The OTELO survey provides the deepest narrow band survey to date, in terms of minimum detectable emission line flux and equivalent width, that has allowed detecting the faintest extragalactic emission line systems. In this way, OTELO data complements other broad band, narrow band, and spectroscopic surveys.

The data has been obtained using the red Tunable Filter of the OSIRIS instrument at the 10.4 m telescope GTC, pointing at the most deeply explored EGS region. This catalogue is complemented with ancillary data ranging from deep X-ray to FIR, including high resolution HST images, that allowed deriving precise photometric redshifts, and obtaining the morphological classification of the extragalactic objects detected.

In this contribution the final catalogue, that will be publicly available by the end of 2018, is presented.

The improved techniques for sky ring subtraction, the astrometric and photometric quality achieved, and the main survey demographics are also presented. A total of 11237 raw sources have been detected in a sky area of 56 squared-arcmin. Within them, 6302 are preliminary emission line candidates, 81 are candidates to stars, while other 483 are candidates to be absorption line systems. The 50% completeness of OTELO catalogue is obtained at an AB magnitude of 26.38. Photometric redshifts have been derived with an accuracy better than $|\Delta z|/(1+z) < 0.2$ for 6600 sources.

Sunyaev-Zeldovich vs dynamical masses. Scaling relations using optical follow-up of Planck SZ sources

Antonio Ferragamo, J. A. Rubiño Martín, R. Barrena,
A. Streblyanka, A. Aguado-Barahona

There are different proxies to evaluate galaxy clusters (GC) masses as the Sunyaev-Zeldovich (SZ) effect, X-ray luminosities, weak lensing measurements or velocity dispersions.

Each proxy has its own observational biases that can lead to biased mass values. We present our characterisation of a scaling relation between SZ mass and dynamical mass using 100 PSZ1 Planck GC. The Planck collaboration has published two SZ catalogues: the PSZ1 (Planck Collaboration XXIX 2014) and the PSZ2 (Planck Collaboration XXVII 2015).

As almost the 30% of these clusters have no known counterparts, we performed an optical follow-up with the goal of validating and characterising the northern sky subsample of the PSZ1 catalogue. During a two year International Time Project 2013-2015 (ITP13) we have confirmed almost 200 clusters with $0.1<z<0.85$, retrieving their spectroscopic redshifts, velocity dispersions, masses, and other physical properties.

Using the hydrodynamical simulations of the INAF-Osservatorio di Trieste, we studied three different velocity dispersion estimators (bi-weight, gapper and the standard deviation) in order to understand the possible biases induced by the reduced numbers of galaxies members detected for each cluster, as a consequence of our observational strategy. We also studied the effects on the velocity dispersion estimation due to the incomplete sampling of the virial radius. These corrections are applied to real data in order to obtain a biased-corrected linear relationship between the SZ mass and the dynamical mass with angular coefficient $0.9<B<1.0$.

The Hubble Constant from SN Refsdal

Jesús Vega Ferrero, J.M. Diego, V. Miranda, G.M. Bernstein

Hubble Space Telescope observations from 2015 December 11 detected the expected fifth counter-image of supernova (SN) Refsdal at z = 1.49. In Vega-Ferrero et al. 2018, we compared the time-delay predictions from numerous models with the measured value derived by Kelly et al. 2016 from very early data in the light curve of the SN Refsdal and find a best value for H_0 = 64 (+9-11) km/s/Mpc (68% CL), in excellent agreement with predictions from cosmic microwave background and recent weak lensing data + baryon acoustic oscillations + Big Bang nucleosynthesis (from the DES Collaboration).

This is the first constraint on H_0 derived from time delays between multiple-lensed SN images, and the first with a galaxy cluster lens, subject to systematic effects different from other time-delay H_0 estimates. Additional time-delay measurements from new multiply imaged SNe will allow derivation of competitive constraints on H_0.

High-significance detection of the relativistic Sunyaev-Zel'dovich effect using Planck data

Ricardo Génova Santos, Adam Hincks, Gemma Luzzi, Elia Battistelli

The Sunyaev-Zel'dovich, a distortion of the CMB spectrum produced by hot gas, was first detected in the direction of galaxy clusters in the 90s. Recently Planck data have led to a big step forward in this field, with the detection of more than a thousand of clusters (some of them detected for the first time). In this talk I will present results showing one of the first measurements of the relativistic corrections in the spectrum of the SZ effect, using Planck data. These measurements are an important milestone in this field. On the one hand, they confirm a theoretical prediction. On the other hand, they open a new window, as they allow to derive estimates of the cluster electron temperature, in an independent and complementary way to other observational probes like X-rays.

Calibrating the galaxy color redshift relation for Euclid and mapping the star formation main sequence

Oliver Díaz Rodríguez

Europe is leading the most ambitious programme to study the nature of dark energy with the upcoming Euclid mission. Weak lensing mapping of the dark matter distribution has emerged as the most powerful observable to map the structure of the universe. An accurate determination of photometric redshifts and then the mapping between colour space and redshift is needed.

However, there are significant regions of that colour space which have not been spectroscopically observed yet. Filling the gaps in these unexplored cell colours before Euclid operation is essential to guarantee an optimum exploitation of Euclid data. Mapping them will also be invaluable for completing our understanding of galaxy evolution. In fact, the spectra of these galaxies will improve our understanding of the evolution of the cosmic star formation up to z ~ 2 and the channels of galaxy transformation throughout an epoch where the global star formation decreases considerably. In particular, it will contribute to better map the relation between star formation rate and star mass (main sequence) of star forming galaxies and the physical aspects related with gas consumption, mechanisms that trigger or quench star formation, stellar mass assembly and evolution, and accretion of gas in flows and mergers.

The project is conducted with a coordinated programme in 10 m telescopes. In particular, 5,500 galaxies up to 24 magnitude will be observed with GTC and VLT. We present the analysis and first preliminary results of the project, validating the observational approach and the feasibility of the telescope and instruments used.

A dust-enshrouded tidal disruption event with a resolved radio jet in a galaxy merger

Miguel Pérez Torres, Seppo Mattila et al.

We present the discovery of an energetic nuclear transient in the central regions of a nearby galaxy merger. The transient radiated at least 1.5×10^{52} erg in the infrared but remained elusive at optical and X-ray wavelengths.

We interpret its properties to arise from a stellar tidal disruption event (TDE) of a massive (2-6 solar masses) star that passed close to the supermassive black hole. Very-long-baseline interferometry monitoring over a decade shows unambiguous evidence for an evolving jet-like morphology, expanding a subluminal speeds. This is the first case of a confirmed resolved radio jet in a TDE ever, thus validating theoretical predictions.

Our observations indicate that much of the emission from the TDE must have been reprocessed by dense gas, and re-radiated at infrared wavelengths by dust, suggesting a possible way for reducing the tension between theoretical luminosity predictions and observations of TDEs in galaxies. Such TDEs from relatively massive, newly formed stars could provide a large radiative feedback, especially at higher redshifts where galaxy mergers are more common.

Angular Redshift Fluctuations: A New Cosmological Probe

Carlos Hernández Monteagudo, G. Hurier, R. Angulo,
J. Chaves-Montero, S. Bonoli

We study the sensitivity of angular redshift fluctuations on cosmological quantities like the phases of peculiar, radial velocities at any redshift, the peculiar velocity growth factor fσ_8 or the local non-Gaussian parameter from inflation, f_NL. This map of angular redshift fluctuations is obtained after projecting, in every pixel of the sky, the galaxies' redshifts after weighting them by a Gaussian centered on a chosen redshift z(obs) under a given width σ_z. We work out the linear theory description of this observable, with reproduces at the few percent level the outcome of numerical simulations, and apply it to real SDSS/BOSS spectroscopic data, providing the most precise measurements of the growth rate of structure, and the strongest constraints on the time dependence of Dark Energy or the deviations of gravity from General Relativity on cosmological scales. The contents of this contribution are currently under review in Physical Review Letters.

Galaxias y Cosmología / Galaxies and Cosmology (GC7)
Viernes 20 de julio / Friday 20 July

9:00	**Sandra Nogueira dos Reis** Deep imaging of the most massive galaxies of the nearby Universe
9:15	**Belén Alcalde Pampliega** Extremely Red Masive Galaxies in the early Universe: mid-infrared bright sources at z>3
9:30	**Luis Alberto Díaz García** Correlations between the size and the stellar population properties of quiescent galaxies
9:45	**Carlos Gómez-Guijarro** Starburst to quiescent from HST/ALMA
10:00	**Panos Sklias** Spatially resolved 2D analysis of z~2 massive star-forming galaxies with HST and ALMA
10:15	**Jakub Nadolny** The OTELO survey as morphological probe of galaxy evolution in the last 10 Gyr
10:30	**Ángela García Argumánez** Self-consistent spatially-resolved star formation histories of 1<z<3 galaxies from CANDELS
10:45	**Alexandre Vazdekis** Abundance ratios and IMF in massive early-type galaxies

Deep imaging of the most massive galaxies of the nearby Universe

Sandra Nogueira dos Reis, Fernando Buitrago

Galaxies change their morphology across cosmic time. Particularly, the most massive ($M^* > 10^{11}$ M_sun) galaxies of the Universe are regarded as early-types in the present-day, however they appear to be more disk-like at high-z ($z > 1$). For this transformation to take place, the core of early-type galaxies in the local Universe must contain their high-z massive and compact galaxy counterparts, according to number density arguments. To disentangle these two components we need to analyse the deepest and highest resolution images that are publicly available, both using photometry and spectroscopy.

We accomplish the first part in this work by performing a double-Sérsic analysis of the lowest redshift ($z<0.5$) massive galaxies, obtained from CANDELS in the h- and i-bands. For the next step we will investigate 3D-spectroscopic MUSE data in order to determine the kinematics and stellar populations for these galaxies' different components. Joining these two studies we will characterize with unprecedented detail the observational properties of early-type galaxy centers vs their outskirts, being thus able to separate for the first time the several components that might constitute the most massive galaxies in our Universe.

Extremely Red Masive Galaxies in the early Universe: mid-infrared bright sources at z>3

Belén Alcalde Pampliega, Pablo Pérez-González, Guillermo Barro

We present the detection of a sample of galaxies which are extremely faint in the optical and near-infrared but bright at mid-infrared wavelengths. This population of galaxies, missed by the deepest HST surveys such as CANDELS of Hubble Frontier Fields, are considerably bright in IRAC. Nearly one third of them are MIPS emitters, most probably revealing the presence of an obscured AGN co-existing with the intense star formation, as measured by Herchel. At high redshift, hese objects may be a major component of the population of massive galaxies and understanding their nature (their red colors can be attributed either to galaxies with evolved stellar populations or extreme dust content in massive starburst galaxies) is key to achieve a comprehensive view of galaxy evolution.

Correlations between the size and the stellar population properties of quiescent galaxies

Luis Alberto Díaz García, A.J. Cenarro, C. López Sanjuan

During the last decades, many authors have put large efforts to shed light on the mechanisms responsible of the generalized growth in size of galaxies. In our study, we aim at stating new constraints on the mechanisms that can drive the growth in size of massive galaxies through the study of the stellar population properties of quiescent galaxies within the stellar mass-size plane.

Making use of a sample composed of ~850 quiescent galaxies down to I<=23 from the ALHAMBRA survey (20 intermediate bands in the optical range complemented with the 3 NIR bands J, H, and Ks) with reliable size measurements and complete in stellar mass, we build the distributions of their stellar populations up to redshift z~1; i.e. during the period of time in which this kind of galaxies doubled in size. The stellar content (ages, metallicities, extinctions, stellar masses, sSFR, etc.) of galaxies is retrieved via SED-fitting using the multi-band photometry of ALHAMBRA and the code MUFFIT, which also includes the uncertainties and degeneracies of all the parameters involved in the analysis for a fair interpretation of the results.

In this talk, I would show the distribution of the different stellar population parameters, as well as the implications of the results for the most extended mechanisms proposed for the growth in size of galaxies. In addition, I would also present an interpretation of these results more focused on the consequences for the formation and evolution of galaxies, as different distributions of stellar population parameters in the stellar mass-size plane would point out that the stellar mass is not the only driver of the galaxy assembly.

Starburst to quiescent from HST/ALMA

Carlos Gómez-Guijarro

Submillimeter galaxies (SMGs) at z > 4 have been proposed as likely progenitors of the massive and compact population of quiescent galaxies at z ~ 2, that eventually evolve into the massive local ellipticals. In this context we have assembled a unique sample of 6 spectroscopically confirmed z > 4 SMGs and followed them up with high-resolution multiband HST and ALMA line and continuum observations (Gómez-Guijarro et al., 2018; Jiménez-Andrade et al., 2018; Karim et al., in prep). From the resolved rest-frame UV and FIR imaging, we have been able to unveil the morphologies, and fully characterise the star formation, and dust attenuation processes in these sources. At the same time, line observations have allowed us to describe the kinematics of the star formation. Together, we have uncovered the origin of these sources in the IRX/beta plane, constrained their stellar and dynamical masses, revealing a minor merger nature from the stars, extreme rotation from the gas, and set a much clearer evolutionary path towards the z ~ 2 quiescent galaxies from unambiguously determined dust sizes and accurate stellar masses.

Spatially resolved 2D analysis of z~2 massive star-forming galaxies with HST and ALMA

Panos Sklias, Pablo G. Pérez González

In this contribution I would like to present some highlights of my ongoing research project at the UCM, in the group of Prof. P.G Pérez González. Our research focuses on distant galaxy evolution in the era of the so-called peak of cosmic star-formation, at z~2. Relying on 2D-resolved photometry from HST and ALMA, we characterize a small sample of massive, extended, star-forming galaxies in GOODS South, via the means of spatially resolved SED fitting. Using different sized grid apertures, we map the physical properties of the sample in the source plane: stellar mass, star forming rates, dust attenuation, and others, and aim to reproduce their star formation histories in a way that is coherent from an energy-balance perspective, thanks to the constrains provided by ALMA.

Our work allows to study high-redshift star formation at the sub-galactic or clump-size scale, assess the applicability of various attenuation laws. We also compare the properties derived with the described approach to the more classically derived values obtained when fitting the integrated photometry of our sample's sources with a single population and dust law fits, making it possible this way to evaluate how well are stellar proporties like mass or age can be retrieved in the cases of non-resolved high-redshift sources.

The OTELO survey as morphological probe of galaxy evolution in the last 10 Gyr

Jakub Nadolny, A. Bongiovanni, J. Cepa, E.J. Alfaro, H. Castañeda, A. Ederoclite, J. Gallego, J.J. González, J.I. González-Serrano, I. Pintos Castro, R. Pérez Martínez, A. Pérez-García, M. Ramón-Pérez, M. Sánchez-Portal.

OTELO (OSIRIS Tunable filter Emission Line Objects) is an emission-line object survey covering a spectral range between 9070-9280 A, in a window of reduced airglow emission. The first pointing of OTELO, in the Extended Groth Strip (EGS), consists of 36 tomographic slices of a passband of 12? FWHM, sampled every 6? obtained with the red tunable filter of OSIRIS at the Gran Telescopio de Canarias (GTC). The limiting flux detected of ~5x10-20 erg s-1 cm-2 makes it the deepest survey in its category to date. See also the contribution of Bongiovanni et al. in this Meeting.

Taking advantage of OTELO survey characteristics in selection of Emission Line Systems (ELS) we aim to present qualitative and quantitative morphological analysis of ELS in specific redshift ranges (e.g. z~0.4 and z~0.8 for Halpha and [OIII] ELS, respectively) and non-ELS at any redshift, in both cases up to z=2 using HST-ACS high resolution images. The source selection process, Sérsic profile fitting, the visual morphology classification and a preliminary analysis of these results are presented.

Self-consistent spatially-resolved star formation histories of 1<z<3 galaxies from CANDELS

Ángela García Argumánez, Pablo G. Pérez-González, Armando Gil de Paz

In order to shed new light on how Milky Way like galaxies are formed, we analyze the star formation histories (SFH) and mass surface density profiles of massive galaxies ($\log(M_*/M_\odot)>10$) at $1<z<3$ in the GOODS-N and GOODS-S fields observed by the Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey (CANDELS). Stellar population parameters are obtained in 2D by first performing multi-wavelength photometry using optical and near-infrared broad-band data from HST. Subsequently, the observed SEDs are fit to stellar population models attenuated by dust. The galaxy sample has been divided according to its activity (star-forming vs quiescent) and compactness (compact vs extended). We will discuss the differences in SFH and mass distribution for each subsample and propose an evolutionary connection among them.

Abundance ratios and IMF in massive early-type galaxies

Alexandre Vazdekis

Massive Early-Type Galaxies are found to present an abundance element pattern that differs from that in the solar neighbourhood. Similarly, the IMF is also found to have an emphasized contribution of dwarf stars with respect to the standard IMF in the innermost regions of these galaxies. However the effects of the IMF and some abundance ratios are strongly degenerated, lurking the analysis. We present new developments in the stellar population modelling that allow us to disentangle these effects. Using these models and new methodology we are able to constrain with unprecedented precision the abundance of some key elements, such as Mg, Na, C, as well as the shape of the low-mass end of the IMF.