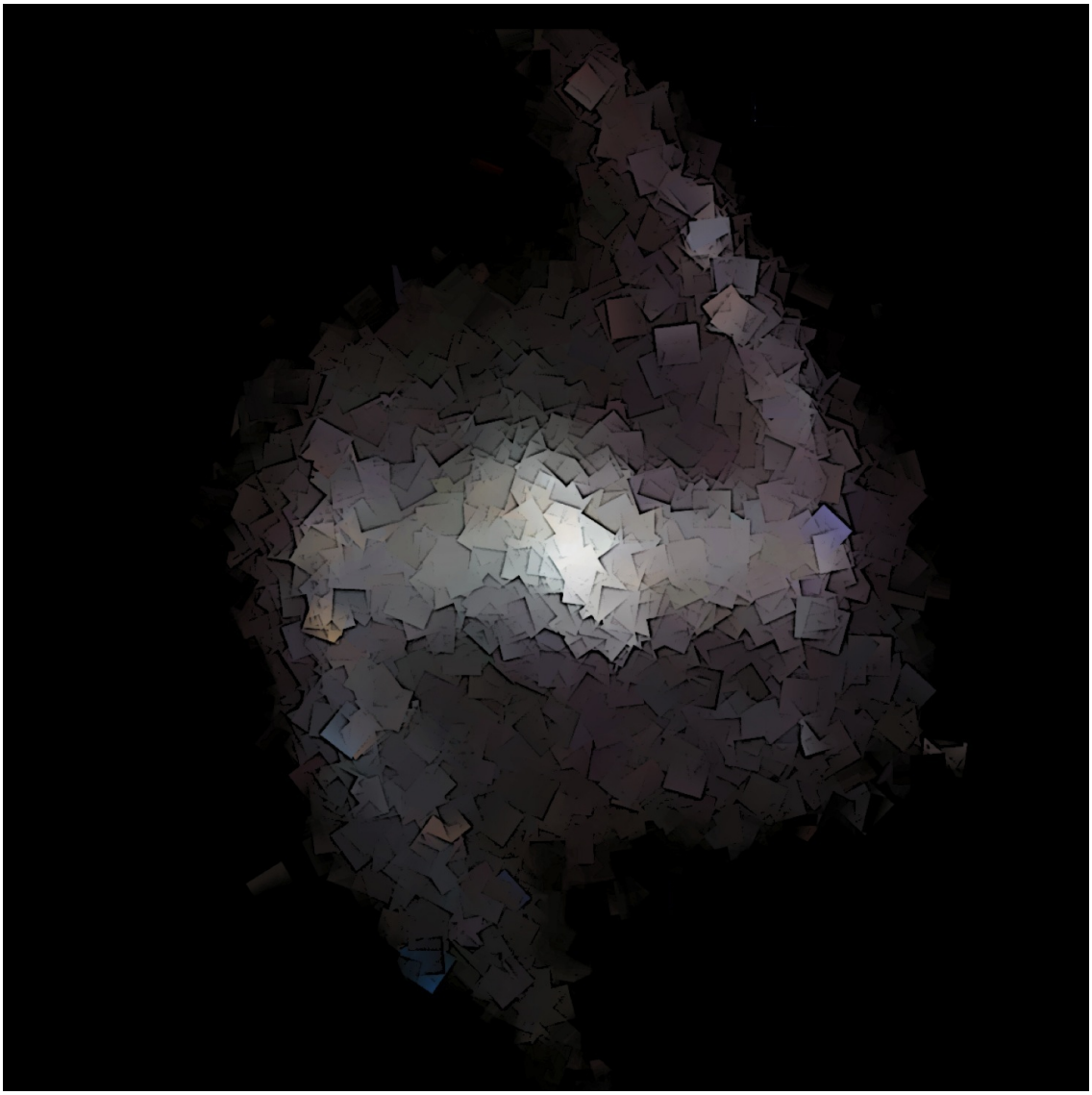
Deconstructing Galaxies, Structure and Morphology in the Era of Large Surveys



November 18-22, 2013, ESO Vitacura, Chile

Contents

Invited Speakers, SOC and LOC

Invited Speakers

- A. Aguerri (Instituto de Astrofísica de Canarias, Spain)
- L. Athanassoula (Laboratoire d'Astrophysique de Marseille, France)
- J. Bland-Hawthorn (Institute of Astronomy, School of Physics, University of Sydney, Australia)
- A. Burkert (Department für Physik, Ludwig-Maximilians Universität München, Germany)
- M. Cappellari (Sub-Department of Astrophysics, University of Oxford, UK)
- C. Conselice (School of Physics and Astronomy, University of Nottingham, UK)
- S. Courteau (Queen's University Physics Department, Canada)
- V. Debattista (Jeremiah Horrocks Institute, University of Central Lancashire, UK)
- R. de Jong (Leibniz Institute for Astrophysics, Potsdam (AIP), Germany)
- E. D'Onghia (Center for Astrophysics, Harvard, USA)
- S. Driver (School of Physics and Astronomy, University of St Andrews, Scotland)
- P.A. Duc (Service d'Astrophysique, CEA Saclay, France)
- L. Ferrarese (Herzberg Institute of Astrophysics, Canada)
- A. Graham (Centre for Astrophysics and Supercomputing, Swinburne University of Technology, Australia)
- P. Hopkins (Caltech, USA)
- E. Laurikainen (Department of Physics, University of Oulu, Finland)
- T. Lisker (Center for Astronomy, University of Heidelberg, Germany)
- K. Masters (Institute of Cosmology and Gravitation, University of Portsmouth, UK)
- K. Sheth (NRAO, Charlottesville, USA)
- L. Simard (Herzberg Institute of Astrophysics, Canada)
- I. Trujillo (Instituto de Astrofísica de Canarias, Spain)
- P. Yoachim, Astronomy Department (University of Washington, USA)

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- R. Sánchez-Janssen (ESO, Chile, co-Chair)
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- F. Combes (Observatoire de Paris, France)
- P. Côté (HIA Victoria, Canada)
- B. Elmegreen (IBM Research, USA)

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- R. Somerville (Rutgers, USA)
- M. West (ESO, Chile)

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- M.E. Gómez
- J.C. Muñoz
- J.K. Krogager
- C. Saulder
- S. Vásquez

Programme

Keynote Talk (KT): 25 min. + 5 min. questions

Invited Talk (IT): 20 min. + 5 min. questions

Contributed Talk (CT): 15 min. + 5 min. questions

November 18th, Monday

Session: Structure, Morphology, and the Underlying Physics

09:00 – 09:10	Conference welcome
09:10 – 09:35	K. Masters (IT): The morphologies of galaxies in the Galaxy Zoo
09:35 – 10:05	S. Driver (KT): The universal mass functions of bulges and disks
10:05 – 10:25	P. Côté (CT): The structure of galaxies in the core of the Virgo cluster
10:25 – 10:45	L. Fogarty (CT): The kinematic morphology-density relation and the formation of slow rotating early-type galaxies with SAMI
10:45 – 11:15	**COFFEE BREAK**
11:15 – 11:40	P.-A. Duc (IT): The mass assembly of early-type galaxies with their fine structures
11:40 – 12:00	Y.-K. Sheen (CT): Post-merger signatures of red-sequence galaxies in rich Abell clusters at z $<$ 0:1
12:00 – 12:25	C. Conselice (IT): The relationship between the stellar light distribution of galaxies and their formation histories
12:25 – 12:45	I. Damjanov (CT): Local and intermediate-redshift analogs of the extreme high-redshift systems: clumpy disks and red nuggets
12:45 – 14:45	**LUNCH**

14:45 – 15:05 T. Gonçalves (CT): Secular evolution in the green valley

15:05 – 15:25 J. Kartaltepe (CT): Galaxy morphology at the peak of galaxy assembly from CANDELS

15:25 – 15:45 D. Sobral (CT): The dynamics, morphologies and evolution of star-forming galaxies since z = 2:23 with KMOS, SINFONI & HST

15:45 – 16:15 **COFFEE BREAK**

16:15 – 16:45 M. Cappellari (KT): The roles of environment, galaxy mass and internal kinematics

16:45 – 17:15 A. Burkert (KT): Galaxy formation modes and their relation to structure

17:15 – 17:35 N. Padilla (CT): Effects of stochasticity of acquisition of angular momentum in the evolution of galaxies

17:35 – 17:55 M. Stringer (CT): Galaxy sizes and morphology as a consequence of cosmology

PROGRAMME

November 19th, Tuesday

Session: Structure and Morphology of Early-Type and Spheroidal Galaxies

09:30 – 10:00 L. Ferrarese (KT): The structure of early-type galaxies

10:00 – 10:20 B. Dullo (CT): Central stellar mass deficits of early-type galaxies

10:20 – 10:40 R.-S. Remus (CT): The dark halo - spheroid conspiracy and the origin and evolution of elliptical galaxies

10:40 – 11:10 **COFFEE BREAK**

11:10 – 11:30 P. Pérez-González: Reconstructing the formation of massive galaxies from their SHARDS

11:30 – 11:50 G. Barro (CT): The progenitors of compact quiescent galaxies at z ~ 2

11:50 – 12:10 S. Belli (CT) : Keck spectroscopy and dynamical masses for a large sample of $1 < z < 1{:}6$ passive red galaxies

12:10 – 12:30 P. Saracco (CT): Discerning the formation from the evolution in elliptical galaxies

12:30 – 14:60 **LUNCH**

14:30 – 14:50 V. Strazzullo (CT): Stellar populations and morphologies of very distant cluster galaxies: a study in Cl J1449+0856 at z = 2

14:50 – 15:10 M. Huertas-Company (CT): The impact of environment on the structural evolution of massive early-type galaxies

15:10 – 15:40 P. Hopkins (KT): The formation of early-type galaxies

15:40 – 16:10 **COFFEE BREAK**

16:10 – 16:35 T. Lisker (IT): The structure of early-type dwarf galaxies

16:35 – 16:55 J. Janz (CT): On the multi-component structures of low-mass galaxies in the Local Universe

16:55 – 17:15 R. Sánchez-Janssen (CT): The intrinsic shape of dwarf spheroidals in the Virgo cluster

17:15 – 17:40 R. Muñoz (IT) : The structural properties of Milky Way dwarf galaxies

17:40 – 18:00 R. Smith (CT): The substantial influence of ram pressure on tidal dwarf galaxies

November 20th, Wednesday

Session: Structure and Morphology of Disc Galaxies

09:00 – 09:30 V. Debattista (KT): Secular evolution of disc galaxies

09:30 – 09:55 E. D'Onghia (IT): Spiral structure formation in disc galaxies

09:55 – 10:15 R. Sorba (CT) : Galaxy Stellar Mass Estimation through Pixel-by-Pixel SED Fitting: The whole is not equal to the sum of the parts

10:15 – 10:35 M. Verheijen (CT) : Mass models from decomposing extended galaxy rotation curves provided by the next generation of HI 21cm imaging surveys

10:35 – 10:55 A. Bouquin (CT): Environmental and morphological-type segregation on the evolution of galaxies out of the blue sequence

10:55 – 11:25 **COFFEE BREAK**

11:25 – 11:50 A. Graham (IT): Galaxy bulges and their SMBHs

11:50 – 12:10 J. Mendez-Abreu (CT): Deconstructing bulge types using the CALIFA survey

12:10 – 12:30 R. Läsker (CT): Effects of data quality and decomposition technique on bulge parameters and the Mbh - Lbul relation in the NIR

12:30 – 12:50 M. Cisternas (CT): Underneath the monster: Quasar host galaxies from deep SDSS Stripe 82 imaging

Free afternoon / Visit to Undurraga Vineyard (Buses leave ESO office at 14:00)

PROGRAMME

November 21st, Thursday

Session: Structure and Morphology of Disc Galaxies

09:00 – 09:30 S. Courteau (KT): Scaling relations of disc galaxies

09:30 – 10:00 I. Trujillo (KT): The outer structure of galaxy discs

10:00 – 10:20 T. Kim (CT): Unveiling the structure of barred galaxies with the S4G

10:20 – 10:50 **COFFEE BREAK**

10:50 – 11:15 P. Yoachim (IT): The structure, kinematics and stellar populations of thick discs

11:15 – 11:35 D. Streich (CT): Age resolved stellar populations in galaxy disks

11:35 – 11:55 I. Minchev (CT): Formation of thick discs in numerical simulations

11:55 – 12:20 R. de Jong (IT): The stellar haloes of disc galaxies

12:20 – 14:20 **LUNCH**

14:20 – 14:45 A. Aguerri (IT): The bar fraction in the Local Universe

14:45 – 15:10 K. Sheth (IT): Redshift evolution of the bar fraction

15:10 – 15:35 E. Laurikainen (IT): The structure of barred galaxies

15:35 – 16:05 **COFFEE BREAK**

16:05 – 16:25 D. Gadotti (CT): Evidence for secular evolution of structural parameters in barred galaxies

16:25 – 16:45 J.C. Muñoz-Mateos (CT): The impact of bars on disk breaks as probed by S4G

16:45 – 17:05 E. Cheung (CT): Galaxy Zoo: observing secular evolution through bars

17:05 – 17:35 L. Athanassoula (KT): The formation and evolution of bars

17:35 – 17:55 F. Iannuzzi (CT): Extracting kinematic quantities out of state-of-the-art hydro simulations of isolated galaxies

Conference dinner – La Casa Vieja (Buses leave ESO office at 20:15)

November 22nd, Friday

Session: Structure of the Milky Way

10:00 – 10:30 J. Bland-Hawthorn (KT): The Milky Way as a disc galaxy

10:30 – 10:50 B. Conn (CT): PanSTARRS and the Milky Way: constructing the Milky Way density profile utilising the entire PanSTARRS dataset

10:50 – 11:10 D. Minniti (CT): Milky Way Structure from the VVV Survey

11:10 – 11:40 **COFFEE BREAK**

Session: Tools and Analysis Methods

11:40 – 12:10 L. Simard (KT): Structural decomposition in large galaxy surveys

12:10 – 12:30 B. Häussler (CT): Examining the morphological properties of GAMA galaxies using MegaMorph

12:30 – 14:30 **LUNCH**

14:30 – 14:50 L. Kelvin(CT): The division of the local galaxy stellar mass function by type and structure

14:50 – 15:10 P. Erwin (CT): Imfit: A fast, flexible new galaxy image-fitting program

15:10 – 15:30 M. Vika (CT) : Separating early-type (Sa/S0/E) galaxies in large surveys

15:30 – 16:00 **COFFEE BREAK**

16:00 – 16:20 A. Charbonnier (CT): Galaxy morphology in large surveys: using SExtractor and PSFex

16:20 – 16:40 S. Bamford (CT): Measuring messy galaxies using a non-parametric component

16:40 – 17:30 Conference Summary and Discussion

Day 1: November 18th, Monday

The Morphologies of Galaxies in the Galaxy Zoo

Karen Masters, University of Portsmouth, UK
Invited talk: 09:10 - 09:35

The universal mass function of bulges and disks

Simon Peter Driver, University of St Andrews, Scotland
Keynote talk: 09:35 - 10:05

The Structure of Galaxies in the Core of the Virgo Cluster

Patrick Côte, HIA, NRC, Canada
Contributed talk: 10:05 - 10:25

The Next Generation Virgo Cluster Survey is a large CFHT program to obtain deep ugriz imaging of the Virgo Cluster using the MegaCam mosaic camera on CFHT. In this talk, I will describe early results from the NGVS on the stucture of hundreds of galaxies in the cluster core, the majority of which have been discovered by the NGVS. Topics to be covered include galaxy scaling relations, axial ratios, colors and nuclear properties.

The kinematic morphology-density relation and the formation of slow rotating early-type galaxies with SAMI

Lisa Fogarty, University of Sydney, Australia
Contributed talk: 10:25 - 10:45

The dynamical structure of galaxies reveals much about their formation history and evolution. Links between observed spatially-resolved kinematic properties, and the physical processes which determine the evolutionary path of galaxies, make integral field spectroscopy (IFS) a powerful probe of galaxy formation. Pioneering work by the SAURON and ATLAS-3D teams has shown that early-type galaxies (ETGs), traditionally thought of as dispersion-dominated systems show strong rotation in $\sim$80% of objects. This led to a new kinematic classification of ETGs into fast rotators (those with a strong rotation signature; FRs) and slow rotators (those showing no sign of rotation; SRs). Due to their drastically different dynamics, these two families must have very different formation histories. The kinematic morphology-density relation can be used to study the effect of environment on the formation of FRs and SRs. Indeed, ATLAS-3D found a low SR fraction in poor environments, with an increase in SR fraction in the centre of the Virgo cluster. Subsequent results have confirmed this trend. However, recently it has also been revealed that the overall SR fraction is globally stable, i.e. the same for all clusters studied, with the distribution of SRs within a cluster showing an increase towards the centre. This work has now been done for three separate cluster environments, Virgo, Abell 1689 and Coma. I will present new results from the SAMI Galaxy Survey, an ongoing multi-object IFS survey of thousands of galaxies. For our pilot observations we studied 106 cluster galaxies in Abell 85, Abell 168 and Abell 2399. Using this data we examined the kinematic morphology-density relation in all three clusters, doubling the number of clusters for which this work can be done. We found that the overall fraction of SRs in each cluster is stable and matches the literature value ($\sim$ 16%). We find an increase in SR fraction at the centre of our clusters for two out of the three, but not in Abell 2399. We also find SRs on the outskirts of out clusters which has not been seen before. From this we conclude that the formation mechanism for SRs must be one that can occur in groups, leading to SRs falling into clusters already fully formed. In this scenario the "centrality" of a galaxy is critical to whether or not it becomes a SR, with

galaxies that dominate their local environment (be it a group or very dense cluster) for a long time being more likely to become an SR through multiple minor mergers from the surrounding halo.

The mass assembly of early-type galaxies with their fine structures

Pierre-Alain Duc, Service d'Astrophysique, CEA Saclay, France
Invited talk: 11:15 - 11:40

Post-merger signatures of red-sequence galaxies in rich Abell clusters at z $<$ 0.1

Yun-Kyeong Sheen, Universidad de Concepción, Chile
Contributed talk: 11:40 - 12:00

We found that a significant fraction (38%) of red early-type galaxies (Mr $<$ - 20) showed post-merger signatures in rich Abell clusters at z = 0.04 - 0.1 (Sheen et al. 2012). We used CTIO 4-m Blanco telescope to achieve mu_r = 30 mag arcsec-2 images of the clusters. Surprisingly, the post-merger fraction is almost comparable to what was found earlier in low-density field environments, 49% (van Dokkum 2005), while the ongoing merger fraction is significantly lower in the clusters. Our result challenges the classical cluster dynamics which claims that galaxies in clusters have large peculiar motions which prevent frequent galaxy mergers. We interpreted our result as that the galaxies are carrying their post-merger signatures from their previous dark matter halo in which galaxy mergers could occur easily as it does in the field environment. This result suggests that a certain fraction of massive early-type galaxies in clusters are assembled at recent epoch. Also it reminds us of how important it is to trace back the previous halo environment of cluster galaxies to understand them (Yi et al. 2013). We will

also discuss on their UV-optical properties which may be related with their merger history.

The relationship between the stellar light distribution of galaxies and their formation histories

Christopher J. Conselice, University of Nottingham, UK
Invited talk: 12:00 - 12:25

Local and intermediate-redshift analogs of the extreme high-redshift systems: clumpy disks and red nuggets

Ivana Damjanov, Harvard-Smithsonian CfA, USA
Contributed talk: 12:25 - 12:45

The most surprising discovery of the integral-field spectroscopic campaign DYNAMO, that has been targeting the most extreme Halpha-luminous galaxies in the entire SDSS (excluding AGN), was a subsample of very rare z$\sim$0.1 objects that are, in terms of stellar mass, star-formation rate, size, and dynamical properties, identical to massive turbulent disks identified at z$\sim$2. The high velocity dispersion of these young disks at high redshift results in a large characteristic scale for star-forming clusters which explains their "clump cluster" morphology. I will present recent results of the high-resolution HST/ACS Halpha imaging of the most extreme systems in the DYNAMO sample, with Halpha luminosities of log(L_Halpha)>42, velocity dispersions on the order of 50 km/s, and with clear evidence for regular disk rotation motions. The size distribution of star-forming complexes in these objects reveals whether they contain the structures equivalent to the star-forming "clump-clusters" that are prevalent in assembling disks at high-redshifts. Compact massive galaxies ("red nuggets") occupy the opposite

end of the high-redshift Hubble sequence. These systems are also considered to be rare at low redshift. I will present a population of nuggets at z$\sim$0.4 that we have discovered in the SDSS sample. In this redshift regime high-resolution imaging can reveal the inner structure of these systems that is not accessible at z>1. Furthermore, large spectroscopic surveys that have been conducted in the same redshift range allow us to properly characterize the environment of massive galaxies and examine in detail the effect that the environment has on the structural evolution of red nuggets.

Secular Evolution in the Green Valley

Thiago Goncalves, UFRJ, Brazil
Contributed talk: 14:45 - 15:05

The bimodality in galaxy properties has been observed at low and high redshift, with a clear distinction between star-forming galaxies in the blue cloud and passively evolving objects in the red sequence. The absence of galaxies with intermediate properties indicates that the quenching of star formation and subsequent transition between populations must happen rapidly. By using very deep spectroscopy with the DEIMOS instrument at the Keck telescope we are able to infer the star formation histories of so-called "green valley"" galaxies at intermediate redshifts (z$\sim$0.8), when the universe was half its current age. We measure the stellar mass flux density of green valley galaxies transiting from the blue cloud to the red sequence and find that this transition happens more rapidly in the past and that at z$\sim$0.8 this process happens more rapidly for more massive galaxies. This suggests a top-down scenario in which the massive end of the red sequence forms first, representing another aspect of downsizing, with the mass flux density moving towards smaller galaxies in recent times. It remains an open question, however, which physical mechanisms are responsible for quenching star formation and how they may be more efficient at z$\sim$0.8 than at lower redshifts. To tackle this we have recently initiated a project to detect the presence of bars at low and high redshift, and correlate their strength with the quenching timescales. This will allow us to infer the influence of secular evolution in galaxies at different epochs.

Galaxy Morphology at the Peak of Galaxy Assembly from CANDELS

Jeyhan Kartaltepe, NOAO, USA
Contributed talk: 15:05 - 15:25

The CANDELS collaboration has undertaken an ambitious program to visually classify galaxies in all of the CANDELS fields down to a magnitude limit of H<24.5. Here, we present our classification scheme and the initial results of these classifications in comparison with various automated classification methods. Using far-infrared data from Herschel, we investigate how galaxy morphology correlates with infrared luminosity, specific star formation rate, and AGN content for a sample of ∼1000 LIRGs and ULIRGs at z∼2.

The dynamics, morphologies and evolution of star-forming galaxies since z=2.23 with KMOS, SINFONI & HST

David Sobral, Leiden Observatory, Netherlands
Contributed talk: 15:25 - 15:45

I will present spatially resolved H-alpha dynamics of typical H-alpha-selected star-forming galaxies since z=2.23 using the new KMOS IFU and SINFONI. The vast majority of the star-forming galaxies at all redshifts can be described by rotating disk models and we use the data to derive inclination corrected rotation speeds. Our H-alpha galaxies are well fitted by the z∼1-2 Tully-fisher relation, confirming the evolution seen in the zero-point. We also investigate the morphologies of a much larger parent sample at z=0.4,0.84,1.47,2.23 using both HST/CANDELS and ground-base imaging and find consistent results in the disk/non-merger fraction we derive from our IFU observations. Most interestingly, we find that the typical size of star-forming galaxies of a given mass does not evolve significantly since z=2.23, suggesting a universal size-mass relation for typical star-forming galaxies over the last 11 Gyrs. We conclude by showing that apart from the strong decrease in the typical SFR of galaxies, SFR*(z) from high to low redshift, the properties of the overall star-forming population reveal a remarkable non-evolution in the last 11 billion years.

The roles of environment, galaxy mass and internal kinematics

Michelle Cappellari, University of Oxford, UK
Keynote talk: 16:15 - 16:45

Galaxy formation modes and their relation to structure

Andreas Burkert, Ludwig-Maximilians Universität München, Germany
Keynote talk: 16:45 - 17:15

Effects of stochasticity of acquisition of angular momentum in the evolution of galaxies

Nelson Padilla, Pontificia Universidad Católica de Chile
Contributed talk: 17:15 - 17:35

Dark matter (DM) haloes, the cradles where galaxies form and evolve, acquire angular momentum in a stochastic way which results in a final non-zero DM adimensional spin parameter. We will see how this process translates into

the ability of the galaxy, living in this DM halo, to form stars. To do this we will first measure this stochasticity from the Millennium II simulation, and then see how it affects the properties of the disc of baryons that forms in the center of a DM halo. We will see that the smooth infall of matter comes in chunks with almost, but not quite, random angular momenta, which affects the ability of a disc to form stars and also the frequency of instabilities in the disc leading to the formation of bars and pseudo-bulges, constituting an episodic disc creation.

Galaxy sizes & morphology as a consequence of cosmology

Martin Stringer, Observatoire de Paris, France
Contributed talk: 17:35 - 17:55

In the context of the wealth of recent work connecting galaxy size growth & morphology to discreet evolutionary processes, we aim to re-establish the equally important influence of underlying cosmic evolution. By reviewing the growth of collapsed structures in standard cosmology, we show how natural physical limits for cooling and feedback manifest as the varying stellar content of collapsed cosmic structures will, in conjunction with conservation of specific angular momentum manifest as a strong correlation between host and galactic radii lead to sizes and morphologies that vary with stellar mass, and evolve with redshift, in a way that is consistent with the published observational results that have recently been the focus of much attention.

Day 2: November 19th, Tuesday

The structure of early-type galaxies

Laura Ferrarese, Herzberg Institute of Astrophysics, Canada
Keynote talk: 09:30 - 10:00

Central stellar mass deficits of early-type galaxies

Bililign Dullo, Swinburne University of Technology, Australia
Contributed talk: 10:00 - 10:20

The centers of giant galaxies display stellar mass deficits (M_def) which are thought to be a signature left by inspiraling black holes from pre- merged galaxies. We quantify these deficits using the core-Sersic model for the largest ever sample of early-type galaxies and find M_def $\propto M_{BH}^{(}1.2 \pm 0.2)$ with M_def $\sim$ 0.5 to 4 M_BH (black hole mass). We find that lenticular disc galaxies with bulge magnitudes M_V < -21.0 mag also have central stellar deficits, suggesting that their bulges may have formed from major merger events while their surrounding disc was subsequently built up, perhaps via cold gas accretion scenarios. Interestingly, these bulges have sizes and mass densities comparable to the compact galaxies found at z $\sim$ 1.5 to 2.

Dark Halo – Spheroid Conspiracy and the Origin and Evolution of Elliptical Galaxies

Rhea-Silvia Remus, University Observatory Munich, Germany
Contributed talk: 10:20 - 10:40

Dynamical modeling and strong lensing data indicate that the total density profiles of early-type galaxies are close to isothermal, i.e., $\rho_{\rm tot} \propto r^{\gamma}$ with $\gamma \approx -2$. To understand the origin of this universal slope we study a set of simulated spheroids formed in isolated binary mergers as well as the formation of spheroidals within the cosmological framework. We show that the total stellar plus dark matter density profiles can always be described by a power law with an index of $\gamma \approx -2.1$ with a tendency toward steeper slopes for more compact, lower-mass ellipticals, and that the amount of stars formed in situ is crucial to understand the origin and evolution of this universal slope. We demonstrate that the variety of complex formation histories as present in cosmological simulations, including major as well as minor merger events, is essential to generate the full range of observed density slopes seen for present-day elliptical galaxies, and provide a comparison to the recent results from strong lensing data for the density slopes of ellipticals at higher redshifts.

Reconstructing the formation of massive galaxies from their SHARDS

Pablo Perez-Gonzalez, UCM, Spain
11:10 - 11:30

One of the most widely researched topics in Extragalactic Astrophysics in the last decades is how the nearby galaxies morphologically classified as ellipticals formed their stars and assembled. In this context, we now have unequivocal observational evidences about the existence of a numerous population of massive galaxies which not only had assembled a considerable amount of stars ($\sim 10^11$ M_sun) by z$\sim$2, but were already evolving passively by that time. These galaxies, the likely progenitors of nearby ellipticals, are also quite compact in comparison with local galaxies of the same mass. These results are mainly based on measurements designed to obtain stellar masses and sizes, and our estimations of these parameters are now quite robust. In order to advance in our understanding of the formation of nearby early-type galaxies, now we need a more secure determination of how exactly those high-z massive red galaxies formed and assembled their stellar mass in just 2-3 Gyr (z>2) in a compact structure. In other words, how was their Star Formation History and which are the properties (age, metallicity, dust content) of their stellar populations? And how could they end up with such high masses and small sizes? In this talk, we will present our results about the SFH of massive galaxies at z=1-3 and their structural evolution down to z$\sim$0 based on the deepest spectrophotometric data ever taken. These data were gathered by the Survey for High-z Absorption Red and Dead Sources (SHARDS), a ESO/GTC Large Program aimed at obtaining R$\sim$50 optical spectra of distant galaxies in the GOODS-N field. Our data are ideal to carry out detailed and robust stellar population and environmental studies down to very faint magnitude s ($\sim$27 AB mag). We will present 2 main results: 1) the precise characterization of the stellar ages and duty cycles of red and dead galaxies at z>1 and their progenitors at higher redshifts; and 2) the constraints imposed by our data (jointly with those from other large surveys) about the interplay between the SFH, environment, and the structural assembly of massive galaxies at 0<z<$\sim$3.

The progenitors of compact quiescent galaxies at z$\sim$2

Guillermo Barro, University of California Santa Cruz, Lick Obs., USA
Contributed talk: 11:30 - 11:50

The remarkably small and compact sizes of massive quiescent galaxies at z$\sim$2 has fueled multiple studies that investigate different evolutionary scenarios to explain how these galaxies formed. A missing part of the puzzle is the nature of their progenitors, which are expected to be massive, compact, star-forming galaxies at higher redshifts. However, direct evidence for such counterparts has proven difficult to obtain even for the deepest HST optical images. In Barro et al. 2013, we use the new WFC3/F160W imaging data from the CANDELS survey to identify for the first time a significant population of compact SFGs at 2<z<3 whose structural properties and number densities provide a strong evolutionary link with the quiescent population at z$\sim$2. The extremely compact nature and undisturbed appearances of these SFGs suggests that a significant structural transformation precedes, and

perhaps induces, the quenching of star-formation. Combining the deepest multi-band HST photometry with NIR grism spectroscopy we also performed a detailed SED modeling of these galaxies obtaining luminosity- weighted ages ranging between 700Myr to 1 Gyr, in good agreement the suggested evolutionary picture. For some of these objects we also detect prominent Balmer breaks and Balmer absorption lines that would a indicate post-starburst nature. Incidentally, we find a high rate of X-ray detections among these galaxies ($> 40\%$) indicating that the triggering of an AGN could also play a fundamental role in the quenching process.

Keck spectroscopy and dynamical masses for a large sample of $1<z<1.6$ passive red galaxies

Sirio Belli, Caltech, USA
Contributed talk: 11:50 - 12:10

One of the most surprising results of recent extragalactic observations is the small physical size of distant massive quiescent galaxies. From $z\sim2$ to $z\sim0$ the effective radii of these galaxies appear to have expanded by a factor of 4 at fixed stellar mass. However, some of this apparent growth could arise from an unfair comparison of high and low redshift populations - an effect known as "progenitor bias" - for example, through the transformation of later, larger galaxies from star-forming to quiescent. In order to investigate this claimed evolution and its possible causes, we present high quality Keck spectroscopy for 103 massive galaxies at $0.9 < z < 1.6$, suitable for determining velocity dispersions and, using publicly available HST images, dynamical masses for a large sample. By studying the ratio of dynamical mass to stellar mass at high redshift we can put important constraints on the evolution of galaxy structure, dark matter fraction, and initial mass function. Our comprehensive new dataset enables us, for the first time, to evaluate the size evolution of galaxies selected at fixed velocity dispersion, a property that should remain relatively constant over time for most growth mechanisms. Via this approach, which is potentially free from progenitor bias, we determine the growth rate of quiescent galaxies over the past 9 Gyr.

Discerning the formation from the evolution in elliptical galaxies

Paolo Saracco, INAF-Oss. Astronomico di Brera
Contributed talk: 12:10 - 12:30

It is now widely accepted the view that the mean size of early-type galaxies as a population increased during the last 9 Gyr. This still debated conclusion has also triggered the view that elliptical galaxies increase their size individually through an inside-out growth: ellipticals born compact to grow subsequently across the time through different mechanisms, mainly dry merging. The evolution of the mean size of early-type galaxies as a population would be due to this continuous structural evolution of individual ellipticals rather than to the new born and shaped ellipticals. In this talk I will discuss the above picture in the light of the results we obtained from the study of the Kormendy and of the size-mass relations for two samples of ellipticals at z$\sim$1.4: the first one composed of about 30 cluster ellipticals and the second one composed of about 30 field ellipticals. The resolved spatial distribution of their stellar populations and properties as derived from the study of the color gradient in a sub-sample of them, will also be presented.

Stellar populations and morphologies of very distant cluster galaxies: a study in Cl J1449+0856 at z=2

Veronica Strazzullo, CEA Saclay, France
Contributed talk: 14:30 - 14:50

Cl J1449+0856 at z=2 is the most distant galaxy cluster for which an extended X-ray emission has been detected. A likely representative progenitor of today"s typical massive clusters, it allows the study of galaxy populations in most dense environments 10 billion years ago, a crucial time bridging proto- clusters to the first established clusters, and marking the main formation epoch of massive cluster early-type galaxies. In the core of this system, a remarkably diverse galaxy population clearly shows how galaxy evolution is in a much more active phase as compared to cluster cores at z<1-1.5. Nonetheless, together with still actively forming galaxies, we identify a population of massive sources already showing quiescent stellar populations and early-type morphologies. These galaxies are mostly segregated within $\sim$200kpc from the cluster center, in the most dense region of this structure. As observed also in the field up to similar epochs, we find a strong correlation between stellar populations and galaxy structure, with most passive galaxies showing an early- type morphology (and viceversa). Although these passive cluster early-types appear smaller than similarly massive early-types in the nearby Universe, as routinely found in high-redshift studies, they seem to be generally larger than their z$\sim$2 field counterparts. These results,

albeit still hampered by poor statistics, would support recent claims of an accelerated structural evolution in high-redshift dense environments.

The impact of environment on the structural evolution of massive early- type galaxies

Marc Huertas-Company, Observatoire de Paris, France
Contributed talk: 14:50 - 15:10

The assembly of the most massive galaxies of the Universe is still an open issue. In particular the structural evolution of massive early-type galaxies (ETGs) has raised a lot of attention in the past years and remains an unsolved issue. Even though it is now well accepted that some of these galaxies were more compact on the early universe, the exact mechanisms provoking the growth are still debated in the literature. I will show in my talk how environment can be used to put additional constraints on the physical processes responsible for the size evolution of massive ETGs. I will focus on some recent observational results showing the dependence of the structural properties of ETGs on large scale environment (from clusters to field) from z$\sim$1.5 to z$\sim$0 (e.g Huertas-Company+13a,b, Delaye +13) which I will confront with the predictions of state-of-the art semi- analytical and halo occupation distribution (HOD) models (Shankar+13a,b). Based on that comparison, I will discuss which physical mechanisms (mergers, disk instabilities, gas dissipation...) are more relevant in driving the relation between structure and environment of massive ETGs at different redshifts.

The formation of early-type galaxies

Philip F. Hopkins, Astronomy Department, Caltech, USA
Keynote talk: 15:10 - 15:40

The structure of early-type galaxies

Thorsten Lisker, University of Heidelberg, Germany
Invited talk: 16:10 - 16:35

On the Multi-component Structures of Low-mass Galaxies in the Local Universe

Joachim Janz, University of Oulu, Finland
Contributed talk: 16:35 - 16:55

Early-type dwarf galaxies, once believed to be simple systems, have recently been shown to exhibit an intriguing diversity in structure and stellar content. To analyze this further, we started the SMAKCED project, and obtained deep H- band images for over 120 early-type dwarf galaxies in the Virgo cluster in a brightness range of 19 < M_r < 16 mag, typically reaching a signal-to-noise of 1 per pixel of ∼0.25" x 0.25" at surface brightnesses of ∼22.5 mag arcsec^{-}2. I present the decompositions of their two-dimensional light distributions. This is the first study dedicated to early-type dwarf galaxies using the two- dimensional multi-component decomposition approach,

which has been proven to be important for giant galaxies. Less than a third of the galaxies fall into the simplest group, namely those represented by a single Sersic function, optionally with a nucleus. In the other galaxies the models include additional components such as inner components and bars. The fraction of simple galaxies strongly depends on galaxy brightness. I will compare our findings for the early-type dwarfs to the multi-component structures in late-type galaxies in different environments from the S4G sample using deep 3.6 ÃĆÂţm images, and I will explore whether the structures may form through interactions with the environment.

The intrinsic shape of dwarf spheroidals in the Virgo cluster

Rubén Sánchez-Janssen, ESO/NRC-Herzberg, Chile/Canada
Contributed talk: 16:55 - 17:15

The Infrared Follow-Up of the Next Generation Virgo Survey (NGVS-IR): Survey Status and First Results

Roberto Muñoz, Pontificia Universidad Católica de Chile
Invited talk: 17:15 - 17:40

The Next Generation Virgo Survey (NGVS) is a multi-wavelength imaging survey of the Virgo galaxy cluster, that was designed to provide deep, high spatial resolution and contiguous coverage of Virgo from its core to the virial radius. In this talk, I will first introduce the near-IR follow-up of the NGVS survey (NGVS-IR) and show the first the results. The NGVS-IR survey consists of K-band imaging of 4 square degree centered on M87 with the WIRCAM instrument at the CFHT telescope, and J and K-band imaging of 5 square degree centered on M49 with the VIRCAM instrument at the VISTA telescope. The aims of the survey are to study the age and

metallicity distributions of M87 globular clusters, the K-band luminosity function of Virgo cluster galaxies, and the identification of $0.8 < z < 1.4$ galaxy clusters in the Virgo area. I will discuss on-going plans for studying the low-mass end of the stellar mass function of galaxies in Virgo.

The Substantial Influence of Ram Pressure on Tidal Dwarf Galaxies

Rory Smith, Universidad de Concepcion, Chile
Contributed talk: 17:40 - 18:00

We study the impact of ram-pressure on Tidal Dwarf galaxies in a parameter study. The ram-pressures we consider could arise in the hot gaseous halos of progenitor galaxies, in groups, or in cluster outskirts. Although ram-pressure only directly affects the disk-gas, we find that gas stripping causes substantial stellar losses in Tidal Dwarf galaxies. In fact, if the gas is completely stripped, our Tidal Dwarfs are destroyed altogether! The strong response of tidal dwarfs to ram-pressure is directly related to their lack of dark matter. These results may be important for assessing the fraction of dwarf galaxies of tidal origin.

Day 3: November 20th, Wednesday

Secular evolution of disc galaxies

Victor Debattista, University of Central Lancashire, UK
Keynote talk: 09:00 - 09:30

Spiral structure formation in disc galaxies

Elena D'Onghia, Center for Astrophysics, Harvard, USA
Invited talk: 09:55 - 10:15

Galaxy Stellar Mass Estimation through Pixel-by-Pixel SED Fitting: The whole is not equal to the sum of the parts

Robert Sorba, Saint Mary's University, Canada
Contributed talk: 09:55 - 10:15

The stellar mass of high-redshift galaxies is often measured through synthetic spectral energy distribution (SED) template fitting. However, the spectra of star-forming galaxies are dominated by the light from newly formed stars, and hence the fitting techniques may over-emphasizing the importance of the younger stars at the expense of the relatively hidden older stellar population. We explore the effects of this "out-shining" property by performing pixel-by-pixel SED fitting on galaxies in the SINGS survey in order to separate the younger and older stellar populations. We then compare the summed pixel-by-pixel characteristics to those obtained from fitting in the traditional way (i.e. as if all the light were integrated together as a point source.) We find that the pixel-by-pixel stellar mass estimate agrees with the traditional estimate for passive galaxies, but is $\sim$20% higher for star-forming galaxies. In other words, the traditional template fitting estimate for star-forming galaxies may miss a significant fraction of the mass contained in older stellar populations. We discuss the potential implications of this effect on the estimates of the masses of high-redshift galaxies and on the cosmic mass assembly measurements.

Mass models from decomposing extended galaxy rotation curves provided by the next generation of HI 21cm imaging surveys.

Marc Verheijen, Kapteyn Astron. Inst., Netherlands
Contributed talk: 10:15 - 10:35

Decomposing extended HI rotation curves into contributions from a galaxy"s main structural constituents provides insights in the dynamical importance of the various baryonic and dark matter components. I will discuss the current state of affairs in this field and present some recent results from the Disk- Mass Survey, indicating that galaxy disks have lower-than-expected stellar mass-to-light ratios and are sub-maximal in nature. I will further describe the planned HI imaging surveys with the SKA pathfinders WSRT/Apertif and ASKAP, yielding atomic-gas maps and velocity fields for $\sim 10^4$ galaxies.

Environmental and morphological-type segregation on the evolution of galaxies out of the "blue sequence": Evidence for a rapid evolution of early-type spirals in dense environments within the S4G/DAGAL survey

Alexandre Bouquin, Univ. Complutense de Madrid, Spain
Contributed talk: 10:35 - 10:55

We have obtained GALEX UV radial surface brightness and color profiles, as well as integrated magnitudes for +1500 galaxies covering ∼70% of the S4G/DAGAL volume-limited sample of nearby galaxies (d<40Mpc), and combined these with Spitzer/IRAC-3.6um photometry. The analysis of the (FUV-NUV) vs (NUV-3.6um) color-color diagram reveals both a so-called "blue sequence", where Irr through Sb"s are located, and a "red cloud", where E/S0 reside. This is opposite to the morphology seen in optical CMDs and it mostly due to the degeneracies between SFH of disk galaxies and dust extinction (which strongly correlates the FUV-NUV and NUV-3.6 colors) and could only be seen thanks to the statistics and wide range of galaxy masses and types provided by S4G/DAGAL. We find many early-type spirals evolving off (or into) this "blue sequence" towards (or from) the "red cloud" that we interpret as a sign of strangulation (or re- birth) of the star formation in these galaxies. Such processes lead to distinct FUV-NUV colors, as this color is very sensitive to recent changes in the star formation activity, compared to other colors (optical ones or even NUV-3.6). Special attention is paid to the dependence of this evolution with the morphological type and environment since these (more than simply the stellar mass) seem to determine which galaxies are currently evolving off the blue sequence.

Galaxy bulges and their SMBHs

Alister Graham, Swinburne University of Technology, Australia
Invited talk: 11:25 - 11:50

Deconstructing bulge types using the CALIFA survey

Jairo Mendez-Abreu, University of St Andrews, UK
Contributed talk: 11:50 - 12:10

In this talk I will present the first results of an ambitious project aimed to accurately determine the demography of bulges in the nearby Universe using the CALIFA survey. It is now well settled that within the bulge family, at least three types of bulges can be distinguished based on their formation histories: classical, disk-like, and boxy/peanuts. From an observational standpoint, this classification is often not so clear due to either its intrinsic complexity or caveats regarding the observational diagnostics to separate bulge types. In fact, the actual contribution of each bulge type to the global mass budget of the galaxies is still not clear, and the relative contribution of secular and merger processes to the bulge evolution not well quantified. Here I will present a comprehensive study attempting to quantify the demography of bulges in the nearby Universe improving previous classifications in two major points: i) we have made use of the Integral Field Spectroscopic data-set provided by the CALIFA survey, the largest and most comprehensive IFS survey of galaxies to date. CALIFA is aimed at obtaining spatially resolved spectra for 600 local ($0.005 < z < 0.03$) galaxies using two different resolutions (R$\sim$850 and R$\sim$1650). The combination of both setups allows us to measure reliable stellar (and gas) kinematic maps together with spatially resolved stellar populations for each bulge. ii) Based on this unprecedented wealth of data, we have used a multidisciplinary approach to characterize the photometric, kinematic and stellar population properties of the CALIFA bulges to safely determine their corresponding type. The first results of this project will

be presented and their implication discussed in the framework of bulge formation and evolution.

Effects of data quality and decomposition technique on bulge parameters and the Mbh-Lbul relation in the NIR

Ronald Läsker, MPIA Heidelberg, Germany
Contributed talk: 12:10 - 12:30

I present a re-calibration of the Mbh-Lbul relation at NIR wavelengths, based on a dedicated set of wide-field imaging data that we obtained on CFHT/WIRCam. Surpassing the resolution and depth of any imaging repository previously available for BH host galaxies, this data enabled us to perform detailed and reliable two-dimensional decompositions that account for bars, nuclei, envelopes, inner disks, spiral arms, rings and cores where they are present, in addition to the "canonical" bulge and disk. We find that in the majority of our targets, a simple bulge+disk decomposition is insufficient to satisfactorily model the data and leads to significantly biased bulge parameters. As a consequence, the log-slope of the Mbh-Lbul relation has been overestimated previously and now, at the updated value of 0.77+/-0.10, it strongly implies a disproportionality of BH and host bulge mass. However, the intrinsic scatter of the relation barely improves from applying more accurate decompositions, and is moreover consistent with the intrinsic scatter of the Mbh-Ltot relation with total host luminosity. In combination, these results question the widely-held view that the Mbh-Lbul relation is "fundamental", both from an observational as well as a theoretical point of view. I will also take a look at the NIR background subtraction strategy, the role of pseudobulges, and statistical aspects of characterizing the BH scaling relations.

Underneath the monster: Quasar host galaxies from deep SDSS Stripe 82 imaging

Mauricio Cisternas, IAC, Spain
Contributed talk: 12:30 - 12:50

The host galaxies of active galactic nuclei are a fundamental tool to learn how the relation between galaxy and black hole has been evolving over cosmic time, and also about the processes triggering the periods of major black hole growth. Nevertheless, and in particular for bright type-1 AGN and quasars, the presence of the bright nuclear source largely dominates the overall light distribution and hinders our ability to properly characterize the underlying host galaxy. In this respect, photometric techniques to model and decompose quasar and host galaxy have been developed and widely used in the past few years. In this talk I will discuss what we have learned about the structure and morphology of AGN host galaxies out to $z\sim2$, and also present new results on the structure and morphological features of low-redshift quasar host galaxies from deep SDSS Stripe 82 imaging.

Day 4: November 21st, Thursday

Scaling relations of disc galaxies

Stephane J. Courteau, Queen's University Physics Department, Canada
Keynote talk: 09:00 - 09:30

The outer structure of galaxy discs

Ignacio Trujillo, Instituto de Astrof ísica de Canarias, Spain
Keynote talk: 09:30 - 10:00

Unveiling the Structure of Barred Galaxies with the Spitzer Survey of Stellar Structure in Galaxies (S4G)

Taehyun Kim, Seoul National University, South Korea

Contributed talk: 10:00 - 10:20

We have performed two-dimensional multi-component decompositions of 144 local barred galaxies using 3.6 micron images from the Spitzer Survey of Stellar Structure in Galaxies (S4G). Our model fit includes up to four components (bulge, disc, bar and a point source) and, most importantly, takes into account disc breaks. We find that bars in higher B/T galaxies are flatter than bars in smaller B/T and bulgeless galaxies. Previous studies have shown that early type disc galaxies have bars with flat surface brightness radial profiles, whereas late type disc galaxies have bars showing steeply decreasing profiles. We quantify how flat or steep bar profiles are by measuring their Sersic indices, and study how this varies with bulge prominence, using the bulge-to-total fraction (B/T). In particular, we find that the presence of a bulge almost always guarantees that the bar is flat. Conversely, bulgeless galaxies mostly have bars with steep profiles. We also find that including a disc break in model fitting disc galaxies is important in order to obtain reliable structural parameters of galaxies, in particular those of bars and bulges.

The structure, kinematics and stellar populations of thick discs

Peter Yoachim, University of Washington, USA
Invited talk: 10:50 - 11:15

Age resolved stellar populations in galaxy disks

David Streich, Leibniz-Institut für Astrophysik Postdam
Contributed talk: 11:15 - 11:35

Stellar populations are most useful for disentangling formation and evolution histories of galaxies. We present here results from the GHOSTS suryvey which uses HST photometry to resolve stellar populations in nearby massive disk galaxies. We have examined the vertical disk structure in six edge-on galaxies: In low mass galaxies, the vertical structures of populations at all ages can be described by single sech^2 profiles, with larger scaleheights for older populations. We do not find any sign of flaring in any of the populations. In massive galaxies we find more extended structures of old and intermediate- aged stars (>1Gyr). While the old component can be explained as a thick disk or halo component, the extended intermediate-aged (1-2Gyr) component poses a challenge to most galaxy evolution models.

Formation of thick discs in numerical simulations

Ivan Minchev, Leibniz-Institut fur Astrophysik Potsdam (AIP)
Contributed talk: 11:35 - 11:55

I will present new results quantifying the contribution of internal (spiral and bar structure) and external (mergers) perturbers on the formation of thickened disc components. While thick discs in external galaxies have been known to have scale-lengths comparable to those of thin discs, recent results suggest that the Milky Way thick disc is centrally concentrated. I will show how this discrepancy can be reconciled.

The stellar haloes of disc galaxies

Roelof De Jong, Leibniz Institute for Astrophysics, Potsdam (AIP), Germany
Invited talk: 11:55 - 12:20

The bar fraction in the local universe

Alfonso Aguerri, Instituto de Astrofísica de Canarias, Spain
Invited talk: 14:20 - 14:45

Redshift evolution of the bar fraction

Kartik Sheth, National Radio Astronomy Observatory, Charlottesville, USA
Invited talk: 14:45 - 15:10

The structure of barred galaxies

Eija Laurikainen, University of Oulu, Finland
Invited talk: 15:10 - 15:35

Evidence for secular evolution of structural parameters in barred galaxies

Dimitri Gadotti, ESO, Chile
Contributed talk: 16:05 - 16:25

The impact of bars on disk breaks as probed by S4G

Juan Carlos Muñoz-Mateos, NRAO/ESO
Contributed talk: 16:25 - 16:45

Contrary to the textbook description of disks as having a simple ex- ponential profile, it is now widely known that most disks exhibit a broken exponential profile, with an inner disk followed by a steeper outer one. Disk breaks are paramount to answer a key question: is the current distribution of old stars in disks the result of in-situ star for- mation, or is it determined by radial stellar migration? I will present results of a study of disk breaks in nearby galaxies framed within the Spitzer Survey of Stellar Structure in Galaxies (S4 G), a survey that has provided us with an unprecedented view of the old stellar backbone of galaxies. I will show observational evidence that bars can create breaks at different radii through resonant interactions, both with the bar alone and with dynamically coupled bar-spiral patterns, and will discuss the implications on the secular evolution of disks.

Galaxy Zoo: Observing Secular Evolution Through Bars

Edmond Cheung, University of California Santa Cruz, USA
Contributed talk: 16:45 - 17:05

We use the Galaxy Zoo 2 dataset to study the behavior of bars in disk galaxies as a function of specific star formation rate (SSFR), and inner galactic structure, i.e., the prominence of the bulge as parameterized by Sersic index and central surface stellar mass density. Our sample consists of 13,295 disk galaxies, with an overall bar fraction of 23.6 $\pm$ 0.4%, of which 1,154 barred galaxies also have bar length measurements. These samples are the largest ever used to study the role of bars in disk galaxy evolution. We find that the likelihood of a galaxy hosting a bar is anti-correlated with SSFR, regardless of stellar mass or bulge prominence. We find that the trends of bar likelihood with bulge prominence are bimodal with SSFR, i.e., in star-forming galaxies, bulges are more prominent in galaxies more likely to host bars, while in quiescent disk galaxies, bars are less frequent where there are prominent bulges. Our observations of bar length reveal a complex picture. In star- forming disks, longer bars are found where the bulges are more prominent, while in quiescent disks there is a maximum in the average bar length as a function of bulge prominence. We interpret these observations using state-of-the-art simulations of bar evolution which include live halos and the effects of gas and star formation. We suggest our observed trends of bar likelihood with SSFR are driven by the gas fraction of the disks; a factor demonstrated to significantly retard both bar formation and evolution in models. We interpret the bimodal relationship between bulge prominence and bar properties as due to the dual effects of classical bulges, that inhibit bar formation but allow bars to grow longer once formed, and the growth of disky pseudobulges by bars themselves. These results represent empirical evidence for secular evolution driven by bars in disk galaxies. This work suggests that bars are not stagnant structures within disk galaxies, but are a critical evolutionary driver of their host galaxies in the local universe (z $<$ 1).

The formation and evolution of bars

Lia Athanassoula, Laboratoire d'Astrophysique de Marseille, France
Keynote talk:: 17:05 - 17:35

Extracting kinematic quantities out of state-of-the-art hydro simulations of isolated galaxies

Francesca Iannuzzi, LAM-Marseille, France
Contributed talk: 17:35 - 17:55

The DAGAL Project builds upon the results from the S4G Survey to probe in detail the structure of the closest galaxies. Synergising the work of observers and modellers within its network, DAGAL aims at tackling fundamental questions concerning the origin and evolution of galaxies. As a member of the Marseille node, my work within DAGAL is on the modeller side. One of my tasks is to provide the other network members with observable quantities extracted from numerical simulations, in order to set an interpretative framework for the properties and formation history of (at least some of the) S4G galaxies. In my contribution, I would like to talk about our ongoing work on extracting realistic kinematics for the gaseous and old/young stellar components out of a suite of hydrodynamical simulations of disc galaxies (Athanassoula, Machado & Rodionov 2013). In these simulations, the shape of the dark matter halo as well as the gas fraction in the disk vary systematically and so do the resulting bar properties, making it interesting to explore the impact on observable quantities.

Day 5: November 22nd, Friday

The Milky Way as a disk galaxy

Joss Bland-Hawthorn, University of Sydney, Australia
Keynote talk: 10:00 - 10:30

PanSTARRS and the Milky Way: Constructing the Milky Way density profile utilizing the entire PanSTARRS data set

Blair Conn, Gemini South, Chile
Contributed talk: 10:30 - 10:50

Milky Way Structure from the VVV Survey

Dante Minniti, Pontificia Universidad Católica de Chile
Contributed talk: 10:50 - 11:10

The Vista Variables in the Via Lactea Survey (VVV) is a public near-IR variability survey scanning the Milky Way bulge and an adjacent section of the disk. The main goal of the VVV Survey is to map the 3D structure of the inner Milky Way and decide among different models of galaxy formation. The survey is being carried out with the ESO 4-m VISTA telescope between 2010 and 2016, covering a billion point sources across an area of 540 deg2. The final product will be a deep near-IR atlas in the YZJHKs passbands, and a catalogue of more than a million variable point sources. The Survey is producing a number of scientific results and discoveries on Galactic structure that will be presented in this talk.

Structural decomposition in large galaxy surveys

Luc Simard, Herzberg Institute of Astrophysics, Canada
Keynote talk: 11:40 - 12:10

Examining the morphological properties of GAMA galaxies using MegaMorph

Boris Haeussler, Universities of Hertfordshire and Oxford, UK
Contributed talk: 12:10 - 12:30

Using a sample of ∼30,000 galaxies from the Galaxy And Mass Assembly (GAMA) survey with wavelength-dependent single-Sersic profile fits, I will show how galaxy structural parameters, such as half-light radius and Sersic index, vary from near-UV to optical to near-IR wavelengths. This provides an alternative way of quantifying colour gradients and studying the relationships between the internal structure of galaxies and their stellar populations. I will explain how the wavelength dependence of structural parameters is a result of (a) mixing bulge and disk components with different colours, and (b) colour gradients within single-component objects due to both stellar population gradients and dust extinction. Furthermore, I will show how differences in the wavelength dependence of galaxy structure correlate with morphology,and illustrate how this can be used, in present-day and future large-scale surveys, to automatically separate different galaxy types and identify samples at key evolutionary phases, e.g. passive disks, central starbursts, etc. Our interpretation of the single-Sersic fits is confirmed using multi-wavelength bulge-disk decompositions to a bright subsample. However, thanks to methods developed by the MegaMorph project, the above approach is robust to very faint magnitude limits, as demonstrated using both simulated data and artificially redshifted images of ∼160 nearby galaxies. Finally, I will use the SEDs derived from our bulge-disk decompositions to determine ages and stellar masses of the individual galaxy components, and show how these improve upon estimates based on integrated SEDs from aperture or single-Sersic measurements.

The Division of the Local Galaxy Stellar Mass Function by Type and Structure

Lee Kelvin, University of Innsbruck, Austria
Contributed talk: 14:30 - 14:50

The complexity of structure within galaxies ranges from simplistic smooth one- component systems, such as classical elliptical galaxies, to complex multi- component systems, such as barred grand-design spirals. Each of these distinct sub-structures exist as a remnant of various competing galaxy formation mechanisms. The accurate measurement of galaxy structure across cosmic time allows for constraints to be placed on the dominance or existence of these various evolutionary pathways, ultimately helping us answer the question of how some fraction of the baryonic mass of the Universe has evolved. We have developed new methods to automatically and reliably quantify such structure, providing a measurement of sub-structural size, magnitude, inclination, orientation and light profile shape via the use of Sérsic modelling. The Galaxy And Mass Assembly project (GAMA) is a joint Anglo-Australian collaboration combining multi-wavelength data from a wide range of ground and space-based

facilities with the ultimate aim of using these data to explore galaxy formation and evolution on scales of 1kpc to 1Mpc. Following the application of our galaxy modelling methods to the GAMA dataset, we present our full structural decomposition results for ∼4000 GAMA main-survey galaxies modelled independently in the optical to near-IR from the SDSS (ugriz) and UKIDSS-LAS (YJHK) surveys. We confirm the total galaxy stellar mass function (GSMF) in the local (z∼0) Universe, and furthermore, show how the local GSMF is broken down both by morphological type and by galaxy sub-structure. In addition, we discuss the implications this may have on the aforementioned galaxy evolution mechanisms, and our future high-redshift aspirations.

Imfit: A fast, flexible new galaxy image-fitting program

Peter Erwin, MPE, Germany
Contributed talk: 14:50 - 15:10

I will present a new, open-source astronomical image-fitting program, specialized for galaxies, which is fast, flexible, and highly extensible. A key characteristic is an object-oriented design which allows new types of image components (2D surface-brightness functions) to be easily written and added to the program. Image functions provided with the program include the usual suspects for galaxy decompositions (Sersic, exponential, Gaussian), along with Core-Sersic and broken-exponential profiles, elliptical rings, and components which perform line-of-sight integration through 3D luminosity-density models of disks and rings seen at arbitrary inclinations. Minimization can be done using the standard chi^2 statistic (using either data or model values to estimate per-pixel errors) or the Cash statistic, which is appropriate for Poisson data in low-count regimes; different minimization algorithms allow trade-offs between speed and decreased sensitivity to local minima in the fit landscape. I will also show that fitting low-S/N galaxy images by minimizing chi^2 can lead to significant biases in fitted parameter values, which are avoided if the Cash statistic is used; this is true even when Gaussian read noise is present.

Separating early-type (Sa/S0/E) galaxies in large surveys

Marina Vika, Carnegie Mellon University, Qatar
Contributed talk: 15:10 - 15:30

In large surveys it is relatively straightforward to divide late- and early- type galaxies using colour or simple structural measurements, such as concentration or Sersic index. However, dividing early type spirals, lenticulars and elliptical galaxies presents much more of a challenge, as they often have similar red colours and only subtle morphological and structural differences. Indeed, determining whether very nearby galaxies (within $\sim$40 Mpc) are lenticular or elliptical can be controversial, and only definitively resolved by expensive kinematic measurements. However, these early-type morphologies represent very different formation histories, and being able to reliably separate them in large surveys is essential to a complete understanding of the galaxy population. I present a study of the structure and morphology of a sample of 163 nearby galaxies with ugriz imaging from the Sloan Digital Sky Survey, well-established Hubble classifications, and kinematic measurements. Using multi-wavelength Sersic profile fits and bulge-disk decompositions, I examine ways of automatically dividing early-type spiral, lenticular and elliptical galaxies, using both structural parameter diagnostics and model selection techniques. I show that the measured variations in structural parameters between different morphologies are consistent with our physical expectations. Finally, I demonstrate our ability to separate early-type galaxies at greater distances, by artificially redshifting our images to qualities typical of large surveys.

Galaxy morphology in large sureys: using SExtractor and PSFex

Aldee Charbonnier, Centro Brasileiro de Pesquisas Fisicas, Brazil
Contributed talk: 16:00 - 16:20

The determination of structural parameters of galaxies provides key information for studies of galaxy evolution and leads to robust photometrical and mophometrical measures that may be useful for photometric redshits and weak lensing, among other applications. The upcoming wide-field surveys will provide an unprecedented number of objects for which their morphology can be determined, enabling several statistical studies. However, fast tools to carry out the automated analysis of these objects, at the same time accounting for the point spread function (PSF) across the observed field are required. The SExtractor software (Bertin & Arnouts, 1996) is widely used in the community for the production of detection catalogs. Its functionality has been recently extended to the characterization of the morphology of objects. It allows to fit a set of brightness profiles automatically for each object on the images (de Vaucouleurs, exponential, more generally the Sersic profile, and a combination thereof).

The PSF of the images may be estimated via the PSFex software, also developed by E. Bertin. These two codes have several advantages: they are compatible in terms of data format (i.e. they can be directly concatenated) and their speed allows for their practical use in large surveys. We have used and tested them on a recent survey conducted with CFHT (the CFHT/MegaCam Stripe-82 Survey - CS82), consisting of $\sim$170 square degrees observed in the i-band down to mag $\sim$ 24, with median seeing of $\sim$0.65" in the so called SDSS "Stripe-82" equatorial region. We present the results of the structural parameters for various profiles for around 16 10^6 objects in this survey. We have carried out thorough tests and comparisons with other datasets and explored the parameter space of the code configurations to obtain optimal measures of the morphology of the galaxies in the survey, at the same time obtaining estimates of the statistical and systematical errors on the structural parameters as a function of observed galaxy properties. The performance of these two codes combined has also been assessed on the COSMOS field observed by the ACS camera on the Hubble Telescope and by CFHT MegaCam (comprising the CFHTLS Deep 2 field - D2). The combined tests on the deep D2 field and the wide CS82 survey provide a good indicative of what may be achieved with the next generation wide-field surveys from the ground such as DES or LSST and pave the way for the exploitation of structural parameters in these surveys. The SExtractor and PSFex suite appear to be up to the task in providing reliable structural parameters for the galaxies in these surveys with a manageable computational time.

MegaMorph: advanced galaxy decomposition for large multi-wavelength surveys

Steven Bamford, University of Nottingham, UK
Contributed talk: 16:20 - 16:40

Most galaxies can be considered to be, at least approximately, two-component stellar systems, containing both a spheroid and disk. These components have distinct formation histories, and thus separating their properties provides a more complete picture of galaxy evolution. Unfortunately, performing this decomposition presents significant challenges, particularly in large surveys, where an automated method is essential. Established decomposition solutions use just one image, at a single wavelength, to determine a galaxy"s structural parameters; occasionally making use of a secondary image to measure colour information. However, modern surveys routinely produce imaging in many near-UV to near-IR bands. Utilising all this available data increases the signal-to-noise available to constrain the structural model. More importantly, the components typically possess different colours, which allows them to be much more robustly separated. Our MegaMorph project has adapted tried-and-tested software (GALFIT and GALAPAGOS) to fit a consistent, wavelength-dependent model to imaging in an arbitrary set of photometric bands. We have tested our technique on both real and simulated data in a variety of

observational regimes. I will describe our approach, and demonstrate that it enables more accurate, robust and physically meaningful multi-wavelength measurements of galaxy structural components. This paves the way for reliably studying the physical properties (stellar mass and age) of spheroids and disks for very large samples.

Posters

Mass-Luminosity Profile in Spiral Galaxies

María Paz Aguero, OAC - CONICET, Argentina

We study the relationship between Kinematics and NIR Surface Brightness in a sample of 22 spiral galaxies. We analyze the uncertainties involved in the determination of mass and luminosities from the velocity and brightness observations, and derive the Mass-Luminosity Ratios (M/L) as a function of radius. These profiles present a constant M/L value in the radial ranges where the photometric disk appears dominant. However, in the central region the profiles present a negative gradient. Finally, we analyze how the observational bias could affect the determination of the dark halo density profile. The halo density profile is strongly dependent on the M/L value adopted for the bulge component which itself is severely affected by dust extinction and age and metallicity gradients.

The Globular Cluster System of The Elliptical Galaxy NGC2986

Andrés Almeida, Universidad Andrés Bello, Chile

We are using deep, wide-field V and I images of NGC2986 taken with Magellan/IMACS at Las Campanas Observatory, Chile. We analyze the color distribution of the GCS using a KMM test, which shows that the system is clearly bimodal as frequently found in early-type galaxies. In addition, we have derived a radial profile of the cluster candidates. By means of a comparison field, we are able to estimate the level of contamination with high confidence. Also, we study the azimuthal distribution and the Luminosity Function to get an estimate of the distance of NGC2986.

High resolution cold gas observations of star-forming galaxies at z$\pm$2

Manuel Aravena, ESO, Chile

MegaMorph: advanced galaxy decomposition for large multi-wavelength surveys

Steven Bamford, The University of Nottingham, UK

Most galaxies can be considered to be, at least approximately, two-component stellar systems, containing both a spheroid and disk. These components have distinct formation histories, and thus separating their properties provides a more complete picture of galaxy evolution. Unfortunately, performing this decomposition presents significant challenges, particularly in large surveys, where an automated method is essential. Established decomposition solutions use just one image, at a single wavelength, to determine a galaxy's structural parameters; occasionally making use of a secondary image to measure colour information. However, modern surveys routinely produce imaging in many near-UV to near-IR bands. Utilising all this available data increases the signal-to-noise available to constrain the structural model. More importantly, the components typically possess different colours, which allows them to be much more robustly separated. Our MegaMorph project has adapted tried-and-tested software (GALFIT and GALAPAGOS) to fit a consistent, wavelength-dependent model to imaging in an arbitrary set of photometric bands. We have tested our technique on both real and simulated data in a variety of observational regimes. I will describe our approach, and demonstrate that it enables more accurate, robust and physically meaningful multi-wavelength measurements of galaxy structural components. This paves the way for reliably studying the physical properties (stellar mass and age) of spheroids and disks for very large samples.

The case of the Hydra I cluster: kinematics and stellar populations

Carlos Barbosa, ESO, IAG-USP, Germany

Halos of elliptical galaxies grow about four times since z=2. However, the mechanisms for this growth is still a matter of debate. Here we present the case of NGC 3311 cD galaxy, in the core of the Hydra I cluster. Previous works have shown the presence of an off-centered envelope high Sersic index (n=10) and at least two disrupting galaxies falling through the system. Taking advantage of a novel set of observations with FORS2 at VLT, we present detailed maps of kinematics and stellar population properties that confirms the current state of interactions around the halo of NGC 3311.

Dark Matter Inferences from Rotation Curve Fitting

Juan Carlos Basto Pineda, Universidade de São Paulo, Brazil and Heidelberg Institute for Theoretical Studies, Germany

Rotation curves of disk galaxies are often used to probe the gravitational potential of their hosting dark matter (DM) haloes. Combining kinematic and photometric data several authors argue that the density profile of galactic halos is nearly flat in the central region ($\rho \propto r^0$). This fact is in contradiction with the steep profile expected from cosmological cold dark matter simulations ($\rho_{inner} \propto r^{-1}$), challenging both observers and theoreticians (so called the core/cusp problem). It is worth nothing however that inherent uncertainties exist in both approaches, preventing a definite verdict on this problem thus far. In this work we attempt to bring the analysis of observations and cosmological simulations closer together. For this we apply the full observers pipeline on a large set of mock data from simulated disk galaxies that were chosen to reproduce several realistic features. Our mock catalog includes SDSS multiband photometry created with the radiative transfer code SUNRISE plus HI intensity and velocity maps similar to those of the THINGS survey. Then we create surface brightness profiles, rotation curves, and rotation curves for the baryonic components in order to disentangle the pure halo contribution to the kinematics and use it to infere its density profile. The results are then compared to the real density profiles as directly measured from the snapshots and the agreement is quantified in terms of several critical parameters such as inclination or the amount of non-axysimmetric features in the light/velocity distributions. Our approach thus provides an accurate assessment of potential systematic uncertainties in the interpretation of the observational data.

Fundamental relations of early-type galaxies in the Antlia cluster

Juan Pablo Calderón, Instituto de Astrofísica de La Plata (CONICET-UNLP), Argentina

The Antlia Cluster is the third nearest populous galaxy cluster, after Fornax and Virgo, at a distance of ∼35 Mpc. The first study previous to our present project was the photographic catalogue by Ferguson & Sandage (1990, FS90), which identified 375 galaxies. Due to its proximity and large population, the Antlia cluster is a quite interesting target to study the galaxies' structure and morphology, with the final aim to contribute to a better understanding of the origin and evolution of galaxies. The observational material used for this study consists of CCD images of four MOSAIC fields (36" x 36") obtained at the Blanco 4-m telescope at CTIO, in R (Kron-Cousins) and C (Washington) filters, and GEMINI/GMOS spectra to confirm membership. Surface photometry was performed for about 240 early-type Antlia galaxies, by means of IRAF tasks plus our own scripts. We fitted Sèrsic models to their surface brightness profiles and characterized the galaxy sample according to total magnitudes and colours, effective radius, effective surface brightness, and Sèrsic index N. In all cases, we fitted one or two components, depending on the residuals systematic behavior. Out of the total sample, 60% of the galaxies had been catalogued by FS90, while the rest are newly discovered galaxies. Finally, we built the fundamental relations that involve the photometric and structural parameters for the early-type galaxies, i.e. colour vs. magnitude, effective surface brightness vs. effective radius, effective surface brightness vs. magnitude, the respective relations with the N index, etc. Taking into account that bright galaxies in Antlia are mostly lenticulars and few ellipticals, these fundamental relations show that the dwarf galaxies in this cluster follow different sequences than their brighter counterparts.

IFU study of the morphologically distorted galaxy Kaz364

César Caretta, Departamento de Astronomía, Universidad de Guanajuato, Mexico

We present preliminary results on the study of the morphologically distorted galaxy Kaz364, a probable member of a substructure of the galaxy cluster A85. The aim of this study is to disentangle the origin and importance of the environmental effects that are acting to produce this distortion, whether they are dominantly hydrodynamical or gravitational. We used IFU data obtained with the Eucalyptus spectrograph, on a 30"x15" field covering the central region of the galaxy, supplemented by photometric data in various bands. We found a complex central kinematical pattern, probably dominated by the biconical emission from the broad line region of the AGN hosted on Kaz364. The pseudo-SED of the galaxy confirms the presence of dust, expected from the Sy2 nature of the AGN. The most striking feature seems to be the misalignment between the plane of the galaxy"s disk and the dust torus. We also present comparative results of the external effects from ram-pressure stripping, tidal interaction with the nearest neighbor and tidal interaction with the cluster"s potential well.

Sub-kiloparsec view of superdense compact galaxies in nearby galaxy clusters

Eleazar Rodrigo Carrasco, Gemini Observatory, Chile

Massive galaxies at z>2 were a factor of 4 smaller than their present-day local counterparts. In the nearby universe (z<0.2), these galaxies are rare and relatively young. Recent works have suggested that nearby cluster of galaxies have significant fraction of massive compact galaxies, which are are old and intriguingly, are not detected in large surveys. In this contribution we present preliminary analysis of the structural parameters of massive compact galaxies in one galaxy cluster based on high resolution, near diffraction limited images obtained with GeMS and GSAOI.

A case study of isolated elliptical galaxies: the dark matter halo and globular cluster system of NGC 7507

Juan Pablo Caso, Facultad de Ciencias Astronómicas y Geofísicas (UNLP), Argentina

We present a comprehensive study of the field elliptical galaxy NGC 7507, using long-slit spectroscopy from GMOS (Gemini South), and deep imaging in R (Kron- Cousins) and C (Washington) from the MOSAIC camera mounted at the Blanco 4-m telescope (CTIO). We study the kinematics of NGC 7507 and the photometric properties of the galaxy and its globular cluster system (GCS). This investigation provides a global description of the galaxy, as well as clues that help to understand how the environment may have affected the morphology and structure of this massive elliptical. Although NGC 7507 has been considered in the past as a clear example of dark matter (DM) presence in early-type galaxies, our results indicate that DM is not necessarily required to explain the kinematics of NGC 7507. Some DM may be present when a radial anisotropy of stellar orbits is considered, but even in this case the DM content is considerably lower than expected for an elliptical galaxy of its brightness ($M_R \sim -22.6$). The color distribution of the GCS shows the blue and red peak usually found in ealy-type galaxies, together with a peculiar sharp peak at intermediate colors that can interpreted as the signature of an old starburst. The specific frequency of the GCS is quite low ($S_N \sim 0.6$), similar to other galaxies in low-density environments and pointing to a very poor system. In comparison with similar galaxies in clusters, the results described above show how important the environmental conditions are in the evolution of galaxies. As a by-product, we detect a main sequence in the stellar foreground population, which can be attributed to the Sagittarius dwarf tidal stream.

Comparing galaxy population in compact groups and loose groups galaxies: brightest group galaxies

Valeria Coenda

We study the properties of the brightest galaxies (BCGs) in compact (CGs) and loose groups (LGs) of galaxies to deepen our understanding of the physical mechanisms acting upon galaxy evolution in different environments. We select samples of BCGs in CGs identified by McConnachie et al., and in LGs taken from Zandivarez & Martínez. We compare a number of physical properties of the BCGs in CGs and in subsamples of LGs defined by their mass and total luminosity. We find that the BCGs in CGs and LGs are different. Some mechanisms responsible of transforming late type galaxies into early types, such as mergers, could be more effective within CGs due to their high densities and small velocity dispersion, thus leading their BCGs along somewhat different evolutionary paths.

A VLT VIMOS-IFU study of the cometary extremely metal-poor galaxies Tol 65 and UM 461

Ricardo Demarco, Universidad de Concepción, Chile

The low heavy-element abundances, very blue colors and cometary/irregular morphology of extremely metal poor (XMP; 12+log(O/H)<7.6) HII/blue compact dwarf (HII/BCD) galaxies suggest that these galaxies are cosmologically young objects. In this contribution we present preliminary results from the analysis of the cometary XMP HII/BCD galaxies Tol 65 and UM 461, based on VLT VIMOS-IFU spectroscopy. Among others, we investigate the spatial distribution of extinction c(Hb), ionization ratios, high-ionization emission lines, chemical abundances and kinematics of the warm interstellar medium in these galaxies.

Star Formation in Balmer Break galaxies at z $<$ 1.5

Jorge Díaz Tello, IATE, Universidad Nacional de Córdoba, Argentina

We present a spectroscopic study about of 100 Balmer break galaxies, which show signs of star formation trough the presence of at least one of the [OII]3727 AA, Hbeta 4861 AA or Halpha 6563 AA. These galaxies span a redshift range from 0.045 to 1.475. We investigate the relation between star formation and stellar mass and its dependance with redshift. We found that more massive galaxies have higher SFR values but lower SSFR than less massive galaxies. At a given mass, high redshift galaxies have on average larger SFR and SSFR values than low redshift galaxies. Finally, bluer galaxies have larger SSFR values than redder galaxies, and for a given color the SSFR would be on average larger for higher redshift galaxies.

On the stability of morphological parameters measurements with redshift

Leonardo Ferreira, Universidade Federal do Rio Grande - FURG, Brazil

Measuring the structural properties of galaxies at different redshifts is a crutial step towards understanding how galaxies form and evolve. Traditional morphological and structural parameters (e.g. Sèrsic intensity, effective radius and index, concentration, asymmetry, Petrosian Radius, Gini coefficient) may be dependent on the image sampling, point spread function and signal to noise ratio. In order to measure how the morphology of galaxies evolve, we need to know how robust our measurements are at different redshifts. In this context, we used the FERENGI application to simulate the effect of observing the same galaxy at different redshifts. We applied the procedure to the FREI and EFIGI databases to artificially redshift local galaxies out to a distance of 2 Gpc ($z \sim 0.5$) and we then used the FOTOMETRIKA package to measure several morphological and structural parameters. In this way, we were able to check how the measurements behave as the spatial resolution and the signal to noise decreases. Those parameters that depend on the distance can be corrected for and compared with other measurements. Other parameters, such as asymmetry (both traditionally measured and an improved version) are found to present stable values with redshift.

The effects of dust extinction on galaxy image decompositions

Dimitri Gadotti, ESO, Chile

Combining Monte Carlo radiative transfer simulations and accurate 2D bulge/disc decompo- sitions, we present a new study to investigate the effects of dust attenuation on the apparent structural properties of the disc and bulge of spiral galaxies. We find that dust affects the results from such decompositions in ways which cannot be identified when one studies dust effects on bulge and disc components separately. In particular, the effects of dust in galaxies hosting pseudo-bulges might be different from those in galaxies hosting classical bulges, even if their dust content is identical. Confirming previous results, we find that disc scalelengths are overestimated when dust effects are important. In addition, we also find that bulge effec- tive radii and Se ÌĄrsic indices are underestimated. Furthermore, the apparent attenuation of the integrated disc light is underestimated, whereas the corresponding attenuation of bulge light is overestimated. Dust effects are more significant for the bulge parameters, and, combined, they lead to a strong underestimation of the bulge-to-disc ratio, which can reach a factor of 2 in the V band, even at relatively low galaxy inclinations and dust opacities. Nevertheless, it never reaches factors larger than about 3, which corresponds to a factor of 2 in bulge-to-total ratio. Such effect can have an impact on studies of the black hole/bulge scaling relations.

Early type galaxies in Compact Groups: stellar kinematics in NGC6845

Germán Gimeno, Gemini Observatory, Chile

We present results of observation of compact group NGC6854 made with Gemini South observatory. This part of the work focuses on the study of internal stellar kinematics of the two early-type galaxies of the group, from the CaT absorption line triplet spectroscopy. The observations were done taking advantage of the GMOS-S Nod-and Shuffle capabilities. This allowed to trace the rotation curve up to more than $2R_e$. Together with GMOS-S imaging, a two component kinematic analysis is performed and the implications related to the evolutionary state of the group are discussed.

Simulations of the formation of the Gould's belt

Gilberto Gómez, CRyA - UNAM, Mexico

We present numerical simulations of the formation of the Gould"s belt in the scenario of the collision of a cloud or dwarf satellite into the Milky Way"s disk. These simulations were performed in the context of the VLBI mapping of star forming regions, which will allow direct comparison of the observed and simulated kinematics.

The Milky Way bar in the context of extragalactic bulges

Óscar A. González, ESO, Chile

The Vista Variables in the Via lactea (VVV) ESO Public Survey, with the VISTA telescope, have yielded a deep, near-infrared, multi-colour (Z,Y,J,H,Ks) photometric coverage of over 320 square degrees. Results based on this impressive dataset are presented, showing the global properties of the bulge in order to investigate its place in the general context of galaxy bulges. In addition, I will present results from our Giraffe Inner Bulge Survey (GIBS) which is now providing spectroscopic metallicities and alpha element abundances for more than 400 stars, and kinematics for more than 2000 stars across the inner Bulge regions. These results provide unique constrains for modern Galaxy formation models.

VIDEO meets MegaMorph: Deriving Photometric Redshifts from Consistently Measured Photometry

Boris Haeussler, Universities of Hertfordshire and Oxford, UK

Photometric redshifts today are largely derived by using aperture photometry measurements that can be prone to observational effects, e.g. different PSFs/reslutions in different observed bands. In this poster, we present a comparison of photometric redshifts using different techniques, especially magnitudes from light-profile fitting that take into account PSF effects. We use MegaMorph to carry out consistent and physically meaningful, multi-band profile fitting and use the resulting magnitude measurements to derive photometric redshifts for a sample of ~ 1000 galaxies in the VIDEO survey. We compare the results to both spectroscopic redshifts available and to results using traditional aperture photometry.

Spiral pattern speed of M51 with stellar catalog from HST/ACS archived images

Takashi Hasegawa, Gunma Astronomical Observatory, Japan

We have derived the spiral pattern speed of the galactic disk of M51 on the basis of stellar catalog extracted from the archived images with HST/ACS (Mutchler et al., 2005), to be 45 ± 5 km/s/kpc. We followed the offset method devised by Egusa et al. (2004, 2009) who measured the pattern speed at the corotation radius where the spiral pattern catches up with the galactic flat rotation. To search for such a radius, they measured the azimuthal offset between CO emission from molecular gas and H-alpha emission from HII regions, from the center to the outer disk. Alternatively, taking advantage of high- spatial resolution of HST/ACS images, instead of HII regions, we took distribution of OB stars, which serve as a more definite proxy of time after star formation. The resultant pattern speed is consistent with Egusa et al. (2009), however, our result is based more densely sampled along the spiral arm. The stellar catalog is available for other applications.

GALAPAGOS - Computational study of galaxy morphologies for a high number of objects

Andreas Hiemer, Institute for Astro- and Particle Physics Innsbruck, Austria

Imaging surveys provide large galaxy samples ideally suited for statistical analysis of structural characteristics. Our code GALAPAGOS can process a complete set of survey images by automating source detection, postage stamp cutting, object mask preparation, sky background estimation and two-dimensional light profile modelling (Barden et al. 2012). It combines SExtractor (Bertin et al. 1996) and GALFIT (Peng et al. 2010) to perform Sèrsic fitting including possibly overlapping neighbors for a complete data set. Here we introduce the latest version of GALAPAGOS, which is programmed in C. Utilizing MPI parallelization allows to process even the largest data sets on modern supercomputers (Hiemer et al., in prep.). In addition, the new version integrates GALFIT features for fitting of multiple components by superimposing Sèrsic profiles for several galaxy components as well as fitting asymmetrical distortions by applying a Fourier mode expansion on elliptical isophotes. We are going to apply the new version of GALAPAGOS initially to the STAGES (Gray et al. 2008) and the GEMS surveys (Rix et al. 2004) to investigate the evolution with time and the dependence on environment of the structure of discs, bulges, bars, and galactic asymmetries.

Exploiting the synergy between ALMA and VLT/AO-IFU

Edo Ibar, Pontificia Universidad Católica de Chile

For several years it has been a challenge to study high-z star-forming galaxies using both optical and sub-millimetre spectroscopy. I have proposed an extra- galactic experiment to forge a synergy between the ALMA and VLT telescopes. I use a uniquely suited star-forming galaxy sample selected from the HiZELS coverage in the UDS, COSMOS and SA22 fields. The sample is located near bright stars that aid AO-assisted IFU H-alpha imaging with SINFONI at 0.15" resolution. These IFU observations have shown that these galaxies present large ionised gas complexes in rotating disks (approximately 50% of the light is in the form of clumps), allowing an estimate of inclination, asymptotic rotation speed and dynamical mass. I lead a SINFONI-ALMA campaign to follow-up these observations and measure the available reservoir of molecular gas mass via the CO(2-1) emission and the spatial distribution of the cold dust at matched resolution. These observations will provide key insights into the drivers of the star-formation (and its efficiency) at z=0.84, 1.47 and 2.23, near the peak of the cosmic star-formation activity, where galaxies were assembling most of their stellar mass.

Elliptical and S0 galaxies with ionized gas disks at 0<z<1

Yara L. Jaffé, Universidad de Concepción, Chile

We present a unique sample of 20 bona-fide elliptical and S0 galaxies at 0<z<1 with extended ionized gas emission from the ESO Distant Cluster Survey. We explore in detail their morphologies, kinematics, stellar populations and environments, as well as their position in the Tully-Fisher relation, colour- magnitude diagram, and the star-formation vs. mass relation. Our results suggest that E/S0s with extended emission acquired their gas after they acquired their morphology, probably from an external source.

Unusual S0 galaxies in the Virgo Cluster

Simon N. Kemp, Inst. de Astronomía y Meteorología, Univ. de Guadalajara, Mexico

We present new photometric and morphological results on some unusual lenticular galaxies in the Virgo cluster. NGC 4620, a dwarf S0, is seen to have a faint, fossil-like spiral arm structure implying stripping processes have affected a previous dwarf spiral galaxy. NGC 4888 appears to be a face-on barred galaxy with faint spiral arms at each end of the bar, although it possibly could represent an edge-on warped disk galaxy. Finally the E-S0 galaxy NGC 4660 has a previously unidentified long curved filament.

The best of two worlds: a z=2.35 DLA galaxy studied in emission using HST and VLT

Jens-Kristian Krogager, ESO, Chile

At high redshift, one of the most powerful methods for studying the enrichment of the interstellar medium comes from spectroscopy of damped Lyman-alpha absorbers (DLAs). However, linking the absorbing systems to galaxies detected in emission has proven to be very difficult due to their faint nature and proximity to a very bright quasar. Here we present the results of space and ground based facilities working together to shed light on the elusive DLA population. We directly detect the faint galaxy at redshift 2.35 next to the quasar and are able to constrain its structure, metallicity and stellar population from HST imaging and VLT spectroscopy. We find that the galaxy is a young, disc-like galaxy with indications of a star-formation driven wind.

The activity of galaxies in clusters: decomposing the population of massive CLASH galaxy clusters at $z \sim 0.45$

Ulrike Kuchner, University of Vienna, Department of Astrophysics, Austria

The massive clusters RXJ1347 and MACS1206, both $z \sim 0.45$, have recently been observed with 16 filters from UV to NIR (ACS+WFC3) in the central 4.07 sq.arcmin (~ 3 Mpc regions), as well as several flanking fields in the outskirts through the efforts of the multi-cycle HST Treasury program CLASH (Cluster Lensing and Supernova survey with Hubble). The wealth of additional data available, which includes an extensive spectroscopic follow up, CLASH-VLT, and large scale Subaru SuprimeCam observations, enables us to accurately determine structural parameters (morphology) and color profiles, while combining this with strong- and weak- lensing analyses which provide mass maps and reveal substructures of the clusters. In addition, the robust SED fits of the galaxies allow derivations of stellar masses, star formation histories, dust content and chemical (metallicity) abundances. The quantitative analysis of the stellar populations with VIMOS spectra yield stellar ages, metallicities and gas abundances, current SF rates and AGN contributions. The clusters were chosen to study the influence of different environments on properties of the galaxy population: RXJ1347 is a highly active massive X-ray luminous cluster, where several subgroups fall into the potential of the main cluster (observations cover the large-scale cluster structure over 1sq.deg) yielding different mixtures of galaxy populations, whereas MACS1206 appears relaxed on both optical and x-ray images. The intermediate redshifts ($z \sim 0.45$) of the clusters on the other hand might hold clues for the evolution of S0 galaxies: Gas stripping and tidal interactions might be an explanation for the transformation of spirals into S0s (review in Ziegler (2000)). These processes leave signs, which we can now trace and quantify with our data. To identify and understand the processes which link galaxy properties to the host cluster are the matter of our research: In our studies, we probe a range of environments and correlate stellar population parameters, SFRs and AGN activity to structural parameters from our morphological analysis. This way, processes that influence galaxy properties, and their relative strengths can be quantified. Through the efforts of the CLASH and CLASH-VLT surveys, we are able to decompose and compare the galaxy populations of an interacting cluster (RXJ1347) as well as a relaxed galaxy cluster (MACS1206).

Reliable Size Measurement of Massive Galaxies at $z \sim 0.5 - 3.0$ in the GOODS-N region with HST/WFC3 Data

Takahiro Morishita, Astronomical Institute, Graduate School of Science, Tohoku Univ., Japan

We analyze the recent released HST/WFC3 IR images in the GOODS-N region and derive the size-stellar mass relations for massive ($> 10^{10} M_{sun}$) galaxies at $z \sim 0.5 - 3.0$. We use GALFIT to obtain the morphological parameters of the massive galaxies after examining the reliability of the fitting method with artificial galaxies. With a careful study of the bias and error in the effective radius, re, we find the median sizes for the QGs increase from $z \sim 3.0$ to ~ 0.5 by a factor of ~ 2, while milder size evolution for the star-forming galaxies (SFGs), which is consistent with previous studies. In addition, we find the evolution of Sersic index, n, of the QGs to be $n \propto (1+z)^{-}$ with $= 0.70 \pm 0.37$, while that of SFGs is unchanged ($n \sim 1$) over the redshift range. We discuss the evolution of r_e and n in the perspective of minor merging.

Structural properties of edge-on galaxies

Aleksandr Mosenkov, Saint Petersburg State University, Russia

We perform two-dimensional bulge/disk decompositions in the optical, near- infrared and infrared bandpasses on a representative sample of edge-on galaxies mainly selected from the Sloan Digital Sky Survey. Galaxies of all morphological types, i.e. bulge-dominated and bulgeless galaxies (including superthin galaxies), are analyzed. The new software pipeline DECA for performing automated decompositions and estimating structural parameters of galaxies is applied. This algorithm provides new capabilities to study large samples of edge-on galaxies allowing to find truncation radii and warp parameters of edge-on disks as well as to investigate the shape of the inner parts of galaxies (e.g. boxy/peanut-shaped bulges). The dust lane masking is applied to decrease the influence of the dust attenuation on the extracted bulge and disk parameters. Correlations of the resulting structural parameters of disks and bulges are investigated. Classical bulges and pseudobulges are well distinct in the correlations which can give a clue to the processes causing the formation of these different types of bulges. This work summarizes the main structural properties of edge-on galaxies that can be derived via photometric decomposition analysis.

Submillimeter Galaxy Number Counts in a Semi-analytic Model: the "Count Matching" Approach

Alejandra Muñoz, Pontificia Universidad Católica de Chile

Fitting submillimeter galaxies (SMGs) into the current theory of galaxy formation has been a challenge since their discovery, even though they are the most luminous star-forming sources at the epoch where galaxy formation peaks. Recent ALMA observations of the Extended Chandra Deep Field South (for which LABOCA detections are available) show that the bright end of the LABOCA number counts is actually comprised by emission from multiple fainter sources, given the high sensitivity and resolution of ALMA maps compared to LABOCA. With the aim of exploring the properties of SMGs, and in analogy to the now- standard abundance matching approach, we perform a "Count Matching" approach through lightcones drawn from a semi-analytic model. We choose various physical galaxy properties given by the model as proxies for their submillimeter fluxes, assuming a monotonic relationship so that the combined LABOCA plus bright-end ALMA observed number counts are reproduced. After turning the catalogs of galaxy positions and fluxes given by the different proxies into submillimeter maps that include a modeling of the observational process, we perform a source extraction as done for maps obtained through observations. With this we study the effects of the observational process in the recovered counts, as well as the galaxy properties derived from the detected sources for each proxy. The difference between the counts with and without the beam of LABOCA can be used to find the best proxy: sources with the highest submm fluxes will have different clustering depending on the assumed proxy, since the sources with the highest value of a given property will be clustered in a particular way; the best proxy then will be such that the clustering measured from the model galaxies is the same that the one given by the ALMA sources, while the recovered clustering from the simulated maps is the same that the one given by the LABOCA SMGs. This can also be confirmed exploring other statistics like redshift, morphology, stellar mass and host halo mass distributions.

Non-parametric galaxy morphology from the far-UV to the far-IR

Juan Carlos Muñoz-Mateos, NRAO/ESO, USA/Chile

Numerical morphology estimators constitute an invaluable tool in the era of large galaxy surveys. On one hand, they can be automatically measured on samples of thousands of galaxies. On the other hand, since they are not tied to a set of predefined morphological types, numerical estimators can be used to compare galaxy morphology at different wavelengths and/or redshifts, where the classical Hubble types may not apply. Here I present a suite of widely used non-parametric estimators (concentration index, asymmetry, second order moment and Gini coefficient) measured in more than 20 photometric bands, all the way from the far-UV to the far-IR, for the galaxies in the SINGS sample. This study provides a detailed quantitative comparison of the spatial distribution of stars (of different ages), gas and dust in nearby galaxies, and constitutes an excellent benchmark for galaxy morphology studies at high redshift.

The Next Generation Virgo Cluster Survey - Infrared (NGVS-IR): I. A new Near-UV/Optical/Near-IR Globular Cluster selection tool

Roberto Muñoz, Pontificia Universidad Católica de Chile

The NGVS-IR project (Next Generation Virgo Survey âĂŞ Infrared) is a contiguous near-infrared imaging survey of the Virgo cluster of galaxies. It complements the optical wide-field survey of Virgo (NGVS). The current state of NGVS-IR consists of Ks-band imaging of 4 deg^2 centered on M87, and J and Ks-band imaging of 16 deg^2 covering the region between M49 and M87. In this paper, we present the observations of the central 4 deg^2 centered on Virgo's core region. The data were acquired with WIRCam on the Canada-France-Hawaii Telescope and the total integration time was 41 hours distributed in 34 contiguous tiles. A survey-specific strategy was designed to account for extended galaxies while still measuring accurate sky brightness within the survey area. The average 5σ limiting magnitude is Ks=24.4 AB mag and the 50% completeness limit is Ks=23.75 AB mag for point source detections, when using only images with better than 0.7" seeing (median seeing 0.54"). Star clusters are marginally resolved in these image stacks, and Virgo galaxies with $\mu_{Ks} = 24.4$ AB mag arcsec^{-2} are detected. Combining the Ks data with optical and ultraviolet data, we build the uiK color-color diagram which allows a very clean color-based selection of globular clusters in Virgo. This diagnostic plot will provide reliable globular cluster candidates for spectroscopic follow-up campaigns needed to continue the exploration of VirgoâĂŹs photometric and kinematic sub-structures, and will help the design of future searches for globular clusters in extragalactic systems. Equipped with this powerful new tool, future NGVS-IR investigations based on the uiK diagram will address the mapping and analysis of extended structures and compact stellar systems in and around Virgo galaxies.

The morphology distribution of 800,000 SDSS galaxies based on colours and concentration index

René Ortega Minakata, Department of Astronomy, University of Guanajuato, Mexico

Using a sample of 2253 galaxies from the SDSS-DR3, Fukugita et al. (2007) assembled a catalogue of galaxies with a visual morphology classification. They correlated these morphological classes with the u-g, g-r, r-i and i-z colours, as obtained form the SDSS. Shimasaku et al. (2001) correlated the same visual morphology classes with an index measuring the concentration of light of the galaxies, defined as the ratio of the Petrosian radii containing 50% and 90% of their total Petrosian flux, r_{50}/r_{90}. Combining both studies, we have a set of five photometric characteristics of these galaxies, as obtained from the SDSS, that relate with their visual morphology. Since it is not practical to obtain a homogeneous, single-person visual morphology classification of galaxy samples larger than tens of thousands, a different approach to infer the distribution of these morphology classes for such a large sample must be taken. In order to achieve this, we have reversely applied the relations described in the previous paragraph to infer the morphology class of $\sim$800K galaxies in the SDSS-DR7 spectroscopic catalogue from their photometric colours and concentration index. We have found that, in a galaxy-by-galaxy comparison, our inferred classes are similar to the visual morphology classes to the same degree as the visual morphology of a single galaxy varies when based on the classification by different individuals. Despite that with this result we consider our inference as successful, we conservatively conclude that our inference is best suited to assess the distribution of the morphology of large samples of SDSS galaxies, since the galaxy-to-galaxy differences are less significant with a larger sample size. We intend to use our inference to study the morphology-local density relation of large samples of galaxies in different environments. We also compare our inference with the results of Lintott et al. (2011, Galaxy Zoo).

The Tully-Fisher relation as a tool to investigate the internal structure of galaxies

Anastasia Ponomareva, Kapteyn Astronomical Institute, The Netherlands

To investigate the internal structure of galaxies we consider in detail the 3.6 μm Tully-Fisher relation taking advantage of spatially resolved HI velocity fields. The main idea is to abandon the classical concept of the Tully-Fisher relation as the correlation using the width of global HI profile, and consider instead the detailed internal kinematics of gas in galaxies. An improved kinematic measure is implemented by deriving hidh-quality rotation curves from the velocity fields, taking into account warps and streaming motions in the disk due to spiral arms or a bar. The decomposition of HI rotation curves into components will provide the mass distribution within the galaxies including baryonic and dark matter.

Hydrodynamical Simulations of the Barred Galaxy NGC 4314: Gas Orbits in the Bar Region

Mariana Ramos, CRyA - UNAM, Mexico

We report the results of a numerical simulation of the barred galaxy NGC 4314. We start with a gaseous isothermal, non-self gravitating disk, initially in rotational equilibrium, which is perturbed by the gravitational potential of the bar estimated in Quillen et al. (1994) using near infrared observations. We then calculate the gas orbits in the region of the bar and compare them with stellar orbits obtained by Patsis (2006).

The Mystery of the σ-Bump - A new Signature for Major Mergers in Elliptical Galaxies?

Rhea-Silvia Remus, University Observatory Munich, Germany

The stellar velocity dispersion of an elliptical galaxy can generally be well approximated by a power law $\sigma \propto r^{\beta}$. However, some observed dispersion profiles show a deviation from this fit in the medium-range regime, usually between 6 and 17 kpc, where the velocity dispersion remains constant with radius, showing a bump-like behavior, which we term the σ-bump. To understand the origin of this σ-bump, we study a set of simulated elliptical galaxies formed in major mergers. We find the σ-bump in all of our simulated ellipticals, with the size and position of the bump slightly varying from galaxy to galaxy. The feature can be seen both in the intrinsic and projected stellar velocity dispersions. In contrast to shells that form during the merger event but evolve with time and finally disappear, the σ-bump stays nearly constant with radius and is a permanent feature that is preserved until the end of the simulation. The σ-bump is not seen in the dark matter and gas components and we therefore conclude that it is a purely stellar feature of the merger remnants.

Emphasizing the possible lineage between Ellipticals and Lenticulars galaxies in the infrared

Laurie Riguccini, NASA-Ames / BAERI, USA

Early-type galaxies (ETGs), including Ellipticals (E) and Lenticulars (S0) are among the most massive galaxies today. Their poorly known formation is still subject to much debate. First believed to have simple, static and old stellar populations, they actually present a complex star formation history. It has already been shown that Lenticulars can be significantly more luminous than Ellipticals. In this talk, I will discuss more the differences between E and S0 mainly though a study of a sample of 24 um selected ETGs in the local Universe. And I will also present a study of the E and S0 in rich environments, comparing these populations in two clusters at different stages in their evolution, Virgo and Coma.

Integral Field Spectroscopy SINFONI observation of AGN at $z \sim 1.6$

Astrid San Martin, Universidad Andrés Bello, Chile

The aim of the study is to obtain properties of distant low luminosity active galactic nuclei (AGN). In terms of galaxy evolution, nuclear activity seems to play an important role. AGN feedback processes may have impacts on the predictions for galaxy properties, as these processes are thought to affect the efficiency of star formation. Therefore it becomes interesting to study the AGN host galaxy. SINFONI is an adaptive optics assisted near infrared integral field spectrometer mounted to the ESO VLT. The integral field spectroscopy allows us to explore spatially extended sources, to resolve properties of high redshift galaxies. We present the observation of two low luminosity AGNs from which we want to disentangle the properties of its host galaxy. The selected galaxies to be studied were observed with SINFONI from VLT at H band. A first data set reduction was perform using the ESO-SINFONI pipeline, additionally was used some Python routines in order to improve some reduction steps. As a result we obtain the data-cube and the spectrum from which can be clearly observed the Ha broad emission line. The deconvolution in the AGN and host galaxy components is the next step in this study.

Color gradients in field and cluster ETGs at z ∼1.4: constraining their radial metallicity and age variation

Paolo Saracco, INAF - Osservatorio Astronomico di Brera, Italy

We present a study of colour gradients in a sample of elliptical galaxies at $z \sim 1.4$. The sample is composed of 20 field ellipticals and 20 cluster ellipticals. We detect in all of them radial variations of the UV-U and U-R restframe colour showing evidence of multiple stellar components. While we found negative U-R colour gradients both in field and in cluster ellipticals, UV-U color gradients are almost always positive with the few exceptions only among field ellipticals. We found that the observed colour gradients cannot be accounted for by a pure radial variation of stellar population metallicity. On the contrary, the analysis performed shows the presence of at least two main stellar components characterized by both a different age and a different metallicity with the younger (DeltaAge $\sim$ 2Gyr) component contributing for less than 10% to the total stellar mass. Independent analysis based on integrated spectral indeces confirm this result showing evidence of multiple stellar components in elliptical galaxies at this redshift.

The peculiar(?) case of [BHF2008] 19 - an extremely compact and massive elliptical galaxy

Christoph Saulder, ESO, Chile

We investigate the case of the allegedly peculiar galaxy [BHF2008] 19 (short b19). It is very compact elliptical galaxy with an outstandingly high central velocity dispersion. This galaxy is believed to have either an extraordinarily massive central black hole or an unusual initial mass function (IMF). We try to find more galaxies with similar overall properties to provide a large sample for further studies. Therefore, we select define a sample of about 50 galaxies consisting the most compact and most massive (highest central velocity dispersion) of more than 100000 SDSS galaxies which were classified by GalaxyZoo to be early type. We study how well these galaxies fit on well-known relations of elliptical galaxies such as the fundamental plane or the red sequence. We also use Sersic fits in addition to the de Vaucouleurs fits provided by SDSS in order to better understand possible peculiarities of the global parameters of these galaxies. Our investigation yields that b19 is not unique and that b19-like objects just form the most massive and most compact tail of the general distribution of elliptical galaxies and that they are that distinct after all. The main objective of this work is to establish the correct framework for understanding b19 and similar galaxies.

The supermassive black hole mass - Sérsic Index (and other) relations(s) for bulges and elliptical galaxies

Giulia Savorgnan, Swinburne University of Technology, Australia

Scaling relations between supermassive black hole (SMBH) mass, MBH, and various host spheroid properties are a powerful tool for studying galaxy-(black hole) coevolution. Furthermore, these relations enable us to predict the masses of SMBHs in other galaxies, and to measure the SMBH mass function and quantify the SMBH space density in our local universe. Graham & Driver (2007) presented evidence for a strong correlation between MBH and the central light concentration of the host bulge, quantified by the Sèrsic index n. The MBH - n relation might be one of the simplest and strongest black hole mass scaling relations, requiring only uncalibrated galaxy images. However, the recent literature has failed to recover a strong MBH - n relation. Working with the authors of those works, we have successfully recovered the useful MBH - n relation. Moreover, we have explored for potential substructure in the MBH - n diagram based on galaxy morphology (elliptical or disc) and the nature of the central light profile (Sèrsic or core-Sèrsic). Future work will focus on accurately modelling the bulge/disc structure of $\sim$80 local galaxies with direct MBH values and a re-investigation of all the black hole mass scaling relations.

Star Formation Rates and Nebular Abundances in Nearby Galaxies

Marianne Takamiya, University of Hawaii, Hilo, USA

Using the Integral Field Unit Spectrograph SNIFS on the UH 2.2m telescope, we have gathered circa 15,000 individual spectra of 30 different star forming regions over 16 different galaxies. The spectra cover a wavelength range from 320 to 1,000nm. We present preliminary measurements of the star formation rates and log(O/H) abundances of the sample. The impact of the lack of an ADC in front of SNIFS will be discussed briefly.

Kinematics and metallicity of Milky Way Bulge

Sergio Vásquez, Pontificia Universidad Católica de Chile / ESO, Chile

Our group have been performed an analysis of red clump stars located along the arms of the Milky Way X-shaped bulge. Using a proper Calcium triplet calibration done for bulge stars, we are measuring metallicities and radial velocities. In this poster I will present the calibration and the first result of our analysis.

The ARO Survey of Nearby Spiral Galaxies

Baltasar Vila Vilaro, Joint ALMA Observatory, Chile

We will present the results of CO(1-0) and 13CO(1-0) observations of a sample of 150 spiral galaxies in the nearby universe with the ARO KP 12m telescope. Trends of the beam-matched intensity ratio of these species with global properties of the hosts will be analyzed.

Galaxy population in 20Mpc^2 field of RXJ1347-11 cluster complex at z=0.5

Bodo Ziegler, University of Vienna, Dept. of Astrophysics, Austria

I will present our multi-wavelength study of a 20x20Mpc^2 field around the very massive cluster RXJ1347.5-1145 at z=0.45 comprising two more clusters, >30 groups and interconnecting filaments. We utilize Megacam and Suprimecam photometry, Galex NUV imaging, HST-CLASH data, XMM/Newton x-ray observations, however, at the heart of the study are >2500 VIMOS spectra taken in three ESO periods on 9 pointings. We contrast galaxy structure to spec. parameters like AGN/SF activity, gas metallicities, kinematics, as a function of stellar mass. We examine the evolutionary status of member galaxies in all environments provided by this rich cosmic structure as revealed by number densities and shear maps.

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