Drifting through the Cosmic Web: the Evolution of Galaxies within the Large Scale Structure

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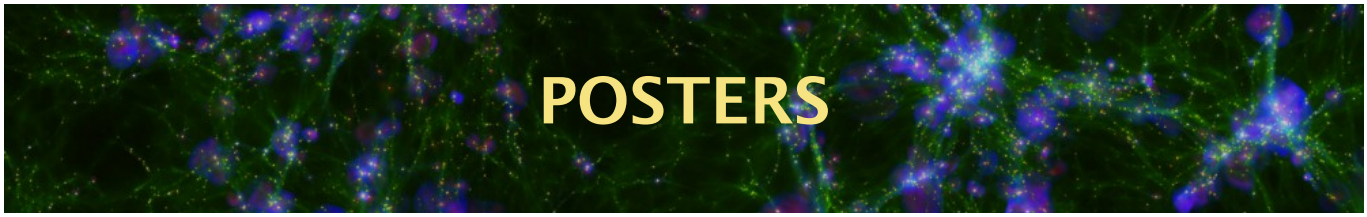

List of Abstracts

Ávila-Pérez Santiago **Approximate Galaxy/Halo Mock Catalogs and HALOGEN**

In the current era of observational galaxy surveys exceeding the Gpc scales we need alternatives to N-Body simulations to generate mock observations. Even though a few N-Body simulations of this size can be run with high resolution in top-world supercomputers, to study the effects of systematic errors and their interplay with cosmic variance and estimate how they propagate to uncertainties in the cosmological parameters, we need the order of hundreds to thousands of realizations of the same simulation. We will present an introduction and comparison of different proposed methods to run faster simulations of the distribution of galaxies in the universe. We will further describe in more detail HALOGEN, a versatile and publicly available tool based on 2nd-order Lagrangian Perturbation Theory (2LPT) and a single parameter bias model.

Bilicki Maciej **Mapping the All-Sky Large-Scale Structure of the Universe**

Various aspects of cosmology require comprehensive all-sky mapping of the cosmic web to considerable depths. In order to probe the whole extragalactic sky beyond 100 megaparsecs, one must draw on multiwavelength datasets and state-of-the-art photometric redshift techniques. I will summarise the current status of our dedicated programme that employs the largest photometric all-sky surveys – 2MASS, WISE and SuperCOSMOS – to obtain accurate redshift estimates of millions of galaxies. The first outcome of these efforts – the 2MASS Photometric Redshift catalogue (2MPZ) – was publicly released in 2013 and includes almost 1 million galaxies with a median depth over 300 Mpc. I will detail how this catalogue was constructed and how it is being used for various cosmological tests. I will also present how combining the WISE mid-infrared survey with SuperCOSMOS optical data allows us to push to depths over 1 gigaparsec on unprecedented angular scales. These photometric redshift samples, with about 20 million sources in total, provide access to volumes large enough to study observationally the Copernican Principle of universal homogeneity and isotropy, as well as to probe various aspects of dark energy and dark matter through cross-correlations with other data such as the cosmic microwave or gamma-ray backgrounds. Last but not least, they constitute a test-bed for forthcoming wide-angle multi-million galaxy samples expected from such instruments as the SKA, Euclid or LSST.

Bravo-Alfaro Hector **Environmental Effects on Galaxy Evolution: Multifrequency Study of Cores and Outskirts of Nearby Clusters**

With the aim of shed light on the transformation from late to early-type of infalling galaxies, we compare results coming from a VLA-HI imaging survey with those provided by deep NIR imaging of clusters. Our goal is twofold: first, to study the ram-pressure stripping effects drawn by HI images (21-cm) obtained with the VLA. Second, we look for systematic tidal features in cluster members, what, eventually, would indicate the presence of gravitational mechanisms driving morphology transformation. Our targets are the Abell clusters A85, A496, A2670, which go from redshift 0.033 to 0.066, and span a certain degree in dynamical evolution, mass and X-ray luminosity. All these objects were survey throughout large volume regions, covering several Abell radius in order to study both, the core and the outskirts of the clusters.

Capelato Hugo **Structure and Dynamics of the Supercluster of Galaxies: the Case of SC0028-0005**

According to the standard cosmological scenario, superclusters are objects that have just passed the turn around point and are collapsing. The dynamics of very few superclusters have been analyzed up to now. In this contribution we will present the results of our study of the supercluster SC0028-0005, at redshift 0.22. Using data - both photometric and spectroscopic - from SDSS-DR10 and from a deep multi-band observation with MegaCam/CFHT, we have been able to

identify the groups and/or clusters of galaxies that make up the supercluster. We investigate the dynamic state of this structure and its mass distribution using weak-lensing effect. The relative distances of the substructures along the line of sight within the supercluster may be obtained using the Fundamental Plane of early-type galaxies allowing the computation of peculiar velocities of each bound structure. Our results suggests that SC0028-005 is indeed a collapsing supercluster. Using the spherical collapse model, we estimate that the mass within r=10 Mpc should lie between 4 and 16 10^{15} $M_{\odot}$. The farthest detected members of the supercluster suggest that within ~60 Mpc the density contrast is $\delta \sim 3$ with respect to the critical density at z=0.22, implying a total mass of ~4.6-16 10^{17} $M_{\odot}$, most of which in the form of galaxy group sized or smaller substructures.

Davis Christina Galaxy Transformation from Flyby Encounters

Galaxy flybys are transient encounters where two halos interpenetrate and later detach forever. Although these encounters are surprisingly common—even outnumbering galaxy mergers for massive halos at the present epoch—their dynamical effects have been largely ignored. Using idealized collisionless N-body simulations of flyby encounters, it has been shown that a galaxy flyby can excite a bar and spin up the halo. Here, we compare the structural properties of recent flybys to that of recent mergers and isolated systems within a high resolution, hydrodynamicalN-body simulation.

Desjacques Vincent Detecting the Cosmological Recombination Signal from Space

Spectral distortions of the CMB have recently experienced an increased interest. In particular, the cosmological recombination lines, emitted by the hydrogen and helium plasma, should be observable as tiny deviation from the CMB blackbody spectrum in the cm--dm spectral bands. In this talk, I will present a forecast for the detectability of the recombination signal with future satellite experiments. I will show that the cosmic web traced by high redshift galaxies is the most serious contaminant. I will discuss ways of mitigating its impact.

Despali Giulia Universal Properties of Dark Matter Halos: Mass Function and Shape

I will present a serie of results regarding the universality both of the halo mass function and of the distribution of triaxial shapes. Over the years, the halo mass function has been studied by many authors, claiming or not its universality. Using a new set of simulations (Le SBARBINE simulations - Despali et a. 2015 in prep.), we conducted a systematic analysis of simulated haloes: we identified spherical and triaxial haloes using six different density thresholds (the virial one and multiples of the background/critical density) and, from each catalogue, we computed the halo mass function at different redshifts. We confirmed the universality of the halo mass function, when measured according to the virial definition and calculated new accurate best fit parameters. Moreover, we modelled the dependence on redshift and overdensity, to provide conversion relations from the virial mass function to all the other ones. This may be particularly useful for a comparison with observational studies, where overdensity different from the virial one are often used. Finally, triaxial halo shapes can be modelled by simple functional forms, independent from redshift and cosmology, using a simple rescaling: this allows to easily generate predictions and mock catalogues for observational studies (Despali+14, Bonamigo+15), for any preferred model.

D'Onofrio Mauro Galaxies Transformation across the Cosmic Web

Abstract not communicated.

Einasto Maret Unusual A2142 Supercluster with a High-Density Core: Distribution of Light and Mass

We study the distribution, masses, and dynamical properties of galaxy groups in the A2142 supercluster with high-density core, centered at the very rich Abell cluster A2142. Galaxy groups and clusters with at least ten member galaxies in the A2142 supercluster lie along an almost straight line forming a 50 Mpc/h long main body of the supercluster. The orientation of the cluster A2142 axis follows the orientations of it's X-ray substructure and radio halo, and it is aligned along the supercluster axis. Most of the galaxy groups in the core region are multimodal. The high-density core of the supercluster may have reached the turnaround radius and started to collapse.

Fragkoudi Francesca The Role of Secular Evolution on Transporting Gas to the Central Regions of Galaxies

Late time gas accretion drives gas from filaments into the discs of galaxies, where non-axisymmetries such as bars and spirals are thought to be responsible for funnelling gas to their central regions. This process is responsible for creating discy(pseudo) bulges and creating a fuel reservoir for AGN feedback. Recent work by Fragkoudi et al. (2015) has shown that secularly induced boxy/peanut bulges, caused by vertical instabilities in bars, could perhaps impede the flow of gas to the central regions. We investigate this by carrying out hydrodynamic simulations in fixed potentials, in order to determine the impact of boxy/peanut bulges on the rate of gas flow to the central-most regions of galaxies.

Gavazzi Raphael Weak Lensing Signatures of the Connexion between Massive Dark Matter Halos and the Cosmic Web

Abstract not communicated.

Giocoli Carlo Weak Lensing Simulations from Current Surveys to Euclid

Weak gravitational lensing represents an important tool for cosmological studies probing the projected matter density distribution along the line of sight. Many studies done by the CFHTLenS collaboration have presented constraints on the matter content of the universe, the dark energy equation of state and the initial power spectrum normalisation In this talk I will show how the GLAMER Code (Petkova, Metcalf and Giocoli 2014) has been interfaced to perform multi-plane ray-tracing from numerical simulations. In particular I will discuss the weak-lensing forecasts for the w1 and w4 field performed using the BigMultiDark simulation (Prada et al. 2014) and the associated public database that will be delivered to the scientific community. In addition, performing weak lensing light-cone in the CoDECS simulations (Baldi 2012), I will talk about where and when to look in the weak lensing observables to search for coupling between dark matter and dark energy.

Krywult Janusz Morphology of VIPERS Galaxies: Co-Evolution of Colors and Shapes

The VIMOS Public Extragalactic Redshift Survey (VIPERS), covering 24 deg^2, enables a detailed analysis of the distribution and physical properties of ~90,000 galaxies in the redshift range $0.5<z<1.2$. Based on the galaxy spectra, photometry and structural parameters of galaxies obtained from the Sersic profile fitting to the CCD images from the CFHTLS survey, we propose a new way of the analysis relating galaxy colours, Sersic index, absolute magnitudes and redshifts to follow co-evolution of galaxy properties. We present new empirical relations relating colours and shapes of blue, green and red galaxy populations and their co-evolution.

Kuligowska Elzbieta The spatial distibution of high-redshifted giant radio galaxies

In my previous work I was searching both high-redshifted ($1<z<4$) and extremaly large-sized classical double radio galaxies with the particular emphasis on the so-called giant ones as well as double-double radio galaxies with restarting activity. Their detection is associated with many observational difficulties. Currently, I want to present the spatial distribution of such radio sources, including their relation with the known positions of another big structures in the Univers (clusters and the regions with a large number of quasars).

Kulikov Igor CosmoPhi: A New Code for Hydrodynamic Cosmology Simulation by Means Intel Xeon Phi Supercomputers

The focus of my talk is the new hydrodynamic numerical model for cosmology simulation, in which the first moments of the collisionless Boltzmann equation for describing of stars component and pressureless hydrodynamic for describing of dark matter component was used. Using this model, allows us to use the uniform numerical method for numerical solution of the hyperbolic (pressureless hydrodynamic, hydrodynamic and first moments of collisionless Boltzmann equation) equations. The numerical method is based on original combination of operator splitting approach and piecewise-parabolic method on local stencil. The hybrid strategy allows obtaining very simple, high-order accurate and low dissipation on shock waves, non-decrease entropy, Galilean invariant and scalability solver. For star formation process and supernova feedback was formulation a non-decrease entropy approach. Using of uniform approach for construction of numerical method allowed obtaining speed-up factors of 134 for Intel Xeon Phi accelerator and maximum efficiency of 92% is demonstrated using 64 Intel Xeon Phi in native mode on the cluster PetaStream of the Joint Supercomputer Center of the Russian Academy of Sciences. This work was supported by Russian Foundation for Basic Research grant number 15-31-20150, and by Grant of the President of Russian Federation for the support of young scientists number MK – 6648.2015.9.

Le Borgne Damien A Global Approach to Quenching History

Several direct tracers of galaxy merging or quenching of star-formation have been used so far to try and measure the frequency at which galaxies transform rapidly from one form to another. Here, I propose an complementary indirect approach using galaxy counts in various wavelengths. A non parametric inversion using PEGASE evolutionary synthesis models allows to quantify the transitions among galaxy populations from one star-formation history to another type of star-formation history.

Luparello Heliana Brightest Group Galaxies and the Large-Scale Environment

We study the dependence of the properties of group galaxies on the surrounding large-scale environment, using SDSS-DR7 data. Galaxies are ranked according to their luminosity within each group and classified morphologically by the Sersic index. We have considered samples of the host groups in superstructures of galaxies, and elsewhere. We find a significant dependence of the properties of late-type brightest group galaxies on the large-scale environment: they

show statistically significant higher luminosities and stellar masses, redder u-r colours, lower star formation activity and longer star-formation time-scale when embedded in superstructures. By contrast, the properties of the early-type brightest group galaxies are remarkably similar regardless of the group global environment. The other group member galaxies exhibit only the local influence of the group they inhabit. Our analysis comprises tests against the dependence on the host group luminosity and we argue that group brightest member properties are not only determined by the host halo, but also by the large-scale structure which can influence the accretion process onto their late-type brightest galaxies.

Montero Dorta Antonio From Galaxies to Halos: Tracking the Evolution of the Most Massive Galaxies in the Universe and Exploring the Intrinsic Halo-Galaxy Connection using BOSS

Studies of the evolution of luminous red galaxies (LRGs) using the extensive Baryon Oscillation Spectroscopic Survey samples (BOSS, Dawson et al. 2013) were originally hindered by large photometric errors and strong selection effects. In Montero-Dorta et al. (2015, arXiv:1410.5854), we use an error model derived from Stripe 82 multi-epoch data to deconvolve the intrinsic red sequence (RS) distribution from these effects, within a hierarchical Bayesian statistical framework. Our novel modeling techniques allow the computation of the RS luminosity function (LF) at $z\sim0.55$ with unprecedented accuracy, taking advantage of a sample of more than 600,000 LRGs. These results are used to place tight constraints on the evolution and formation times of the most massive galaxies in the Universe. In a soon-to-be-submitted paper, we further combine these results with velocity dispersion likelihood function measurements to compute the intrinsic Faber-Jackson relation (FJR) from BOSS. Our FJR results imply that the most massive early-type galaxies in the Universe obey remarkably different scaling relations than their lower-mass counterparts, which seems to suggest fundamental differences in their mass profile properties. In the second phase of our project, we intend to combine our results with N-body numerical simulations to investigate the intrinsic physical parameters that govern mass clustering and the halo-galaxy connection. In my talk, I would discuss the main assumptions and results of our forward modeling, that starts by understanding the BOSS data and its completeness properties, and is ultimately aimed at exploring the very intrinsic connection between galaxies and the dark matter halos they inhabit. As I would highlight during my talk, our framework is also applicable to other ongoing and future Dark Energy surveys like eBOSS.

Pelgrims Vincent Large-Scale Polarization Alignments and the Cosmic Web

Extreme-scale (> 1Gpc) alignments of polarization vectors of quasars are found at radio and optical wavelengths. Although the radio and optical surveys cover different parts of the sky, the regions where the polarization vectors are coherently oriented do show overlaps. Besides, on smaller scales (<1 Gpc), the optical polarization vectors of quasars show a correlation with the orientation of their host large-scale structure, a Large Quasar Group. With the recognized evolution of the spin-axes of galaxies relative to the cosmic web, these observations suggest an explanation for the extreme-scale polarization alignments.

Pénin Aurélie A New Theoretical Framework of the Link between the Efficiency of Star Formation and Dark Matter

There have been tremendous advances in the last decade in the understanding of star-formation within large scale structure, especially on the influence of the dark matter environment on its quenching. However we only have a blurry picture of this quenching with respect to the spatial position of the galaxy within the dark matter halo. Indeed, Indeed, the dominant processes responsible for the gas removal and/or the cessation of the gas supply depend if the galaxy lie at the bottom of the potential well or on the edges of the potential well . The combination of several theoretical approaches along with recent galaxy surveys and the increasing accuracy of the estimation of stellar masses and star formation rates within these surveys allow the development of more complex models. I will present a novel theoretical halo occupation distribution framework based on the efficiency of star-formation that combines the clustering of galaxies as well as the specific star formation distribution. This approach gives directly access to the discrimination between central and satellite galaxies. Its application to the COSMOS survey leads to the quantification of the quenching of star-formation of these two populations of galaxies with respect to the halo mass and to the stellar mass.

Perez-Fournon Ismael The Most Luminous, Dusty Star-Forming Galaxies at High Redshift Discovered by Herschel

Galaxies at very high redshifts have been discovered by deep optical and near-infrared surveys. However, they are typically not very massive and present star formation rates up to several hundred solar masses per year. The Herschel Multi-tiered Extragalactic Survey (HerMES, Oliver et al. 2012, MNRAS, 424, 1614), the largest project that has being carried out with the Herschel Space Observatory, has discovered massive, maximum-starburst galaxies up to a redshift of 6.34 (Riechers et al. 2013, Nature, 496, 329; Dowell et al. 2014, ApJ, 780, 75). The discovery of these dusty star-forming galaxies (DSFGs) at high-z challenges current theoretical models of galaxy formation. I will describe the method we had developed to find these dusty, massive, star forming galaxies at $z > 4$ based on Herschel/SPIRE colours,

present results from multi-wavelength follow-up observations, including ALMA cycle 2 spectroscopy of a sample at z > 5, and on-going studies of the environments of these extreme galaxies.

Peschken Nicolas Formation of Disc Galaxies in Major Mergers: Comparing the Properties of the Merger Remnants to Observations

We use high resolution N-body simulations, including gas and its physics to study the properties of major merger remnants. We decompose the radial photometric profiles into disc and bulge components. We find that the disc is composed of two parts, the inner and the outer, both exponential but with different scale lengths. The profiles are down bending, i.e. of type II. We also discuss the vertical distribution and the formation of the thin and thick disc components. Finally we compare the distribution of the stars to that of the gas.

Ponomareva Anastasia The Multi-Wavelength Tully-Fisher Relation: Hunting for the Intrinsic Scatter

The statistical properties of the Tully-Fisher relation provide important constraints for semi-analytical models and numerical simulations of galaxy formation and evolution. Over the past decades, the scatter in the Tully-Fisher relation has been decreased significantly by accurate photometric measures in the NIR bands. However, the small measurement errors on total luminosity can no longer explain the observed scatter. Therefore, we abandon the classical concept of the Tully-Fisher relation as a correlation using the width of global HI profile and consider instead the internal kinematics of gas in galaxies. As it is still not clear at which wavelengths the smallest scatter in the relation can be achieved, we assemble the Tully-Fisher relation for a calibrator sample of galaxies with measured TRGB/Cepheid distances over the broad wavelength range from FUV to 22 mm. We implement an improved kinematic measure by deriving high quality rotation curves, taking into account warps and streaming motions in the disk due to spiral arms or a bar. As a result, our studies show that besides the wavelength dependence, statistical properties of the Tully-Fisher relation are highly sensitive to the internal kinematics of gas.

Pranger Florian Cluster Mergers, Galaxy Properties and the Fate of Red Spirals

We investigate the evolution of galaxy properties in pre- and post-merging galaxy cluster systems at z~0.1. We complement XMM-EPIC X-ray data with 2dF and EFOSC2 multi-object spectroscopy and ESO 2.2m WFI multi band imaging and analyse spectroscopical quantities (Halpha and [OII] equivalent widths, star formation rates) and morphological descriptors (e.g. Gini-coefficient, M20 index) as well as B-R and V-I restframe colour as functions of clustercentric distance and with respect to morphological galaxy type. In addition we investigate the distribution of various galaxy types in colour-magnitude space and physical space. We detect imprints of the ongoing cluster mergers on the galaxy populations in terms of SF-activity and galaxy morphology. Quality and intensity of these imprints depend on the dynamical state of the merging cluster system (pre-merger/post-merger). We find that merger shock-waves and dynamical friction are candidates for processes driving the observed changes in galaxy properties. These hypotheses are supported by a numerical study of 12 galaxy cluster of different dynamical state (Hoeller et al. 2014). Further, our findings are in compliance with recent results, both from observations and simulations obtained (e.g. Owers et al. (2012), Stroe et al. (2014), Kleiner et al. (2014), Roediger et al. (2014)). Generally, our results comply with the scenario of a ram-pressure driven transformation of infalling field spirals into cluster S0s. We argue that the class of disk galaxies without line emission (no-EL disks) defined in our work represents an intermediate stage between red spirals and S0 galaxies in this transformation scenario. In collaboration with the OCA in Nice, we are currently preparing an extended methodology which will be applied to a statistically significant sample of 400 clusters from the SDSS C4 catalogue (pre-investigated w.r.t. cluster morphology and substructure), to make statements on the correlations between large-scale properties of galaxy clusters and properties of the hosted galaxies on a hitherto unmatched statistical level. The talk will contain a description of methods and a general outlook to this unique project.

Quiret Samuel Probing Gas Flows around Galaxies with Metals

State-of-the-art cosmological simulations indicate that metallicity is a key diagnostic to probe gas flows around galaxies. We propose to present results based on new abundance determination of gas-selected galaxies observed in absorption along the line-of-sight of background quasars. Based on a sample of 250 high-spectral resolution quasars' spectra from UVES/VLT, we perform an analysis of the metallicity distribution of these objects at different redshifts. We analyse these results in light of the recent claims of possible bimodal metallicity distribution as a signature of pristine accreting gas and metal-rich outflowing gas.

Rodrigues Myriam From the First Galaxies to the Formation of the Hubble Sequence

The combination of high spatial resolution from space and 3D spectroscopy from ground is a remarkable tool to dissect distant galaxies and their internal motions. Combining JWST/NIRCAM and E-ELT/MOS (MOSAIC) will capture what are

the physical processes dominating the formation of the first galaxies. Representative samples of galaxies at different epochs can be gathered for a follow-up of their properties all the way from z~7 to z=0. Such a combination has been already experienced with HST/ACS and VLT/GIRAFFE & SINFONI, establishing the evolution of the Hubble Sequence since the last 8 billion years. It has shown the importance of the disk formation in galaxies within the Milky Way mass range. The impact of mergers has been also re-evaluated solving the long-standing problem of the disk survival and perhaps, the angular momentum crisis. Projections of future facility capabilities predict that the formation of galaxies may reveal new surprises that may considerably impact the cosmology in the next decade.

Romeo Alessio On the Multicolour Evolution of Red Sequence Galaxy Populations: Predictions from Hydrodynamical Simulations and Semi-Analytical Models

By means of our cosmological-hydrodynamical simulation and semi-analytical model we studied galaxy populations properties in clusters and groups, spanning over 10 different bands from UV to NIR, and their evolution since redshift z=2. We compare our results in terms of galaxy red/blue fractions and Red Sequence luminous-to-faint ratio (LFR) with recent observational data reaching beyond z=1.5. We find that the Butcher-Oemler effect is wavelength-dependent, with the fraction of blue galaxies increasing steeper in optical-optical than in NIR-optical colours. Besides, only when applying a lower limit for sample selection in terms of fixed absolute magnitude, a steep BO effect can be reproduced, while the blue fraction results less evolving when selecting samples by stellar mass or evolving magnitude limit. We also find a very mild evolution of LFR, especially if measured in terms of stellar mass. As to differences through environments, we find that normal groups and (to less extent) cluster outskirts present the highest values of both blue fraction and LFR at low z, while fossil groups and cluster cores the lowest: this separation begins after z~0.5, whilst at high z all groups coincide at almost the same conditions.

Ulmer Melville Connecting the Dots: A Filamentary Structure between M1231, Abell1560 and SDSS J1223+511

We present the analysis of the about 15' region of the sky consisting of the z = 0.2 clusters MS1231, Abell 1560, and SDSS J1233+511. The analysis is based on Chandra, XMM, SDSS and WIYN observations. We show a clear concentration in galaxy counts associated with the X-ray emission and mass maps. From these results, we argue we have detected a filamentary structure that extends nearly 3 Mpc. We discuss these results in comparison with other X-ray detected filaments.

Wang Liang Presenting NIHAO project: Numerical Investigation of a Hundred Astrophysical Objects

My talk will introduce a project NIHAO, a set of 100 cosmological zoom-in hydrodynamical simulations performed using the GASOLINE code. The haloes in this project range from dwarf to Milky Way masses. Our simulated galaxies reproduce the observed inefficiency of galaxy formation as expressed through the stellar mass vs halo mass relation, together with the SFR vs stellar mass and baryonic Tully-Fisher with observational estimates. The scatter in our simulated TF relation are small and consistent with observational estimates. This uniformity confirms the self-regulating nature of galaxy formation in a LCDM universe.

Wilkinson Aaron Using Galaxy Clustering to Probe the Termination of Star Formation in Distant Galaxies

We still do not fully understand why massive galaxies switch off their star formation in the distant Universe. To investigate this problem, we study the clustering of post-starburst (PSB) galaxies, a rare population that had recently gone through an intense starburst, followed by an abrupt quenching of their star formation. Using angular cross-correlation techniques, we can estimate halo masses for this new population, to compare with their passive and star-forming counterparts. Our sample is based on the UKIDSS Ultra Deep Survey, from which we recently identified 750 PSB candidates in the redshift range 0.5<z<2.0 using a PCA technique. I demonstrate that low mass post-starburst galaxies are very strongly clustered and appear to reside in the most massive halos, suggesting that the termination of star formation is most efficient for low mass galaxies in dense environments. Finally, I explore the clustering of submillimeter galaxies identified in the SCUBA-2 Cosmology Legacy Survey. I present new evidence that these highly luminous dusty objects are the progenitors of the post-starburst galaxies we see at later epochs.

Yu Liang Using Cosmic Voids to Constrain Sigma_8 and Omega_m*h

The dependence of the abundance of cosmic voids on sigma_8 and Omega_m*h allows us to constrain those cosmological parameters. This has been shown in our previous work where we have developed a theory framework

that compares model predictions with observational void statistics, and provides cosmological information from the large-scale galaxy distribution, see details in Betancort-Rijo et al. 2009 (MNRAS, 400, 1835). We have developed a void finder algorithm, following Patiri et al. 2006 (MNRAS, 369, 335), that will provide the number density of voids drawn both from BOSS, and eBOSS which will constrain sigma_8, omega_matter and the evolution of dark energy w(z) in the redshift range from 0.15 to 0.9. We define voids as non-overlapping maximal spheres empty of galaxies with stellar mass above a given value. Now we are using larger simulations to improve our theory framework to reach better accuracy.

Zhao Cheng Halo Mass Distribution Reconstruction across the Cosmic Web

We study the relation between halo mass and its environment from a probabilistic perspective. We find that halo mass depends not only on local dark matter density, but also on non-local quantities such as the cosmic web environment and the halo-exclusion effect. Given these accurate relations, we have developed the hadron-code (Halo mAss Distribution ReconstructiON), a technique which permits us to assign halo masses to a distribution of haloes in three-dimensional space. This can be applied to the fast production of mock galaxy catalogues, by assigning halo masses, and reproducing accurately the bias for different mass cuts. The resulting clustering of the halo populations agree well with that drawn from the BigMultiDark N-body simulation: the power spectra are within 1-σ up to scales of $k = 0.2\ h\ \mathrm{Mpc}^{-1}$, when using augmented Lagrangian perturbation theory based mock catalogues. Only the most massive haloes show a larger deviation. For these, we find evidence of the halo-exclusion effect. A clear improvement is achieved when assigning the highest masses to haloes with a minimum distance separation. We also compute the 2- and 3-point correlation functions, and find an excellent agreement with N-body results. Our work represents a quantitative application of the cosmic web classification. It can have further interesting applications in the multi-tracer analysis of the large-scale structure for future galaxy surveys.