III. POSTER ABSTRACTS

1. Miguel Angel Aragon: *Multiscale Morphology Filters Applied to Segmentation of the Large Scale Structure.*
We present a new method to enhance and detect filaments in the large scale distribution of galaxies using a multi-scale approach. The method also detects wall and blob-like structures with very good results and promises to be an excellent tool in morphology segmentation of large galaxy surveys.

2. Monika Biernacka: *Evolution of Galaxy Clusters*
On the basis of 377 Abell nearby galaxy clusters coming from DSS we determined the cluster ellipticity. It was done using covariance ellips method. We found weak correlation between cluster redshift and ellipticity. We confirm this relation noted by Plionis.

3. Nico Cappelluti: *The XMM-Newton COSMOS survey: First X-ray data*
COSMOS is a worldwide multi wavelength collaboration built around an HST Treasury Program providing deep ACS coverage of 2 deg2. The results from the first 0.9 Ms (out of 1.4) observation with XMM-Newton are presented here. We reach a flux limit of 0.8, 4.9 and 8.2 X 10-15 cgs, respectively in the 0.5-2, 2-10 and 5-10 keV band detecting 682, 313 and 56 sources in each band in the central squared degree. 19 extended sources identified as clusters or groups were found. We also compare the logN-logS distribution with previous results from Chandra and XMM-Newton.

4. Conrado Carretero: *Abundance ratios of early-type galaxies as a function of their environment*
We present the values of CN and Mg overabundances with respect to Fe, for early-type galaxies in 8 clusters over a range of richness and morphology. Abundances were derived from absorption lines and SSP models. We find a clear anti-correlation between [CN/Fe] values and cluster X-ray luminosity. No correlation was observed for [Mg/Fe]. This behaviour is expected, given varying formation timescales for CN, Mg and Fe, combined with a different star formation history in early-type galaxies as a function of their environment.

5. Rossella Cassano, G.Brunetti and G.Setti: *Statistical properties of giant radio halos from particle acceleration models*
The most spectacular evidence for the non-thermal phenomena in galaxy clusters comes from the synchrotron radio emission diffused on Mpc scales (the so called giant radio halos) detected in a growing number of massive galaxy clusters. There are several arguments in favour of the possibility that the giant radio halos may be the product of the synchrotron emission from relativistic electrons reaccelerated by some kind of turbulence developed in the cluster volume during the cluster merger events. In Cassano & Brunetti (2005) we modeled the statistical properties of Radio Halos and the connection between thermal and non-thermal phenomena in galaxy clusters. We developed a statistical particle acceleration model in which the formation of galaxy clusters and the injection of MHD turbulence during cluster mergers are calculated in a self--consistent approach. In particular, we have shown that the expected probability to form giant radio halos as a function of the mass of

the host clusters is in good agreement with the observations. Here, we show that our model can also reproduce the observed correlations between synchrotron power of radio halos and the mass and temperature of the parent clusters. In addition the evolution with redshift of the probability of formation of Radio Halos, their Luminosity Functions and Number Counts are calculated as a function of the physical parameters (magnetic field intensity and scaling with cluster mass), and compared with present observations.

6. Tapan Chatterjee: *Formation of Ellipticals and Galaxy Merger Rates*

Low energy collisions are most frequent. A study the orbital trends of such collisions, leads to the order of magnitude of their frequency. The frequency is found to be about of the order of 1 per cent of all galaxies. Since the observed frequency of ellipticals is about 10 per cent, it is too low to account for the formation of ellipticals by mergers of spirals. On the other hand it just accounts for the formation of BCMs. These are the galaxies which show observational evidence of having suffered collisions. This indicates that galactic collisions are a sporadic phenomena which modifies their structures; and favors the formation of ellipticals by gravitational contraction. Observational evidence based on redshifts and clusters of galaxies is strongly suggestive of the same. This evidence will be critically discussed.

7. Aeree Chung, Jacqueline van Gorkom, David Schiminovich ,Jeffery Kenney, Hugh Crowl, Bernd Vollmer: *Preliminary Results of VLA HI Imaging of Selected Virgo Cluster Spirals*

We present preliminary results of VLA HI imaging of selected Virgo cluster spirals. Our sample consists of 41 galaxies in total, which are spread throughout the cluster and span a wide range in star formation properties. Our result reveals kinematical or morphological signatures of various mechanisms at work in cluster environment, including ongoing ICM pressures, gas accretion, ICM-ISM interactions, tidal interactions and possibly the effect of the cluster potential. We also find features that have been predicted to be rare in clusters such as truncated gas disks in cluster outskirts and extended diffuse gas tails in dense regions. Virgo cluster must be in its actively forming stage with providing detailed information of cluster formation and galaxy evolution in cluster environment.

8. Coenda, Valeria, Muriel, Hernan , Donzelli, Carlos Jose., Quintana, Hernan, Infante, Leopoldo, Garcia Lambas Diego: *Photometric Scaling Relations and Segregation In Clusters of Galaxies*

We have analysed CCD images of 14 Abell clusters in the R filter of the SARS survey (Way et al 2004), with $cz<40000 kms^{-1}$. We have obtained the luminosity profiles for 507 galaxies of which 232 (46%) have known redshifts. In order to fit the luminosity profiles we used the de Vaucouleurs law for bulge systems, an exponential profile for disk systems and we have also fitted the Sersic's law (r^n) to all galaxy profiles. We have studied several relations between these parameters. We have found that bulges and disks show consistency with a unique relation in the μ_e-$\log(r_e)$ plane. We also found that Sersic law fitting parameters n, r_s and μ_s show a strong correlation in agreement with other authors suggesting the idea that not only ellipticals but all galaxies are likely to be understood as a one parameter family.

In addition, we analyse photometric properties of 1384 cluster galaxies as a function of the normalized distance to cluster center. These galaxies were selected in the central region (r/r_{200}= 0.8). We have studied the morphology-clustercentric distance

relation on the basis of the shape parameter n of the Sersic's law. We also have analysed the presence of a possible luminosity segregation for both, the galaxy total luminosity and that of their components (i.e. the bulge and the disk). Results show a marginal decrease of the total luminosity as a function of normalized radius. However, when bulges are analysed separately, a significant luminosity segregation is found. The fraction of bulges brighter than M_B=-22 is three times larger in the core of clusters than in the outer region. Our analysis of the disk component suggests that disks are, on average, less luminous in the cluster core than at r/r_{200}~0.8. In addition, we found that the magnitude-size relation as a function of r/r_{200} indicates that disks are smaller and centrally brighter in the core of clusters.

9. Soñya Cora: "*Hybrid Model of the Chemical Enrichment of the ICM*"

We develop an hybrid model of the metal enrichment of the intracluster medium (ICM) that combines cosmological adiabatic hydrodynamical N-body/SPH simulations of cluster of galaxies, and a semi-analytic model (SAM) of galaxy formation. The link between SAM results and the chemical enrichment of gas particles in the N-body/SPH simulation constitutes the key feature of our hybrid model, which allows to analyze the spatial distribution of metals in the ICM, to investigate the way in which the chemical enrichment proceeds, and to use iron emissivity as a tracer of gas motions.

10. Rene Fassbender: "*The XMM-Newton Distant Cluster Project*"

We have initiated a search for very distant clusters of galaxies with z>1 in XMM-Newton archive data. The poster will present the results of our pilot study, which yielded the most distant, massive galaxy cluster known to date, and the current status of the project.

11. Lorena Gazzola, Emma King, Frazer Pearce, Peter Coles
The growth of baryonic structure in the presence of an isotropic magnetic field

The existence of magnetic fields in the intracluster medium is now well established. We present the first results from a suite of cosmological simulations that include the effects of a magnetic field by introducing an isotropic seed field that follows the density with B~ρ^{α}. We have varied the strength of the seed field and the power law index according to observational and theoretical constraints and investigated the affect this has on the growth and properties of cosmological structures.

12. S. Giacintucci: "*The cluster relic source in A521*"

We present high sensitive radio observations of the merging cluster A 521. The observations were carried out with the GMRT at 610 MHz. A radio relic was found at the cluster periphery, perpendicular to the axis of the ongoing merger. Thanks to the wealth of information available in the literature in the optical and X-ray bands, a detailed multi-band study of the relic and its surroundings was performed. Our analysis shows a tight connection between this source and the complex ongoing merger in the same cluster region. The number of radio galaxies found in the cluster is in agreement with the expectations from the standard luminosity function for cluster ellipticals, suggesting that the ongoing merger in this region has no significant influence on the AGN radio activity. The relic in A 521 (z=0.247) is the most distant after A 2744. The detection of such sources at intermediate redshifts is crucial to our understanding of their origin and connection with cluster mergers.

13. Nectaria Gizani: "*Intracluster Magnetic Fields & the Hercules A Cluster*"
The origin of the cluster magnetic fields is still a topic of debate. Their study is important as magnetic fields in galaxy clusters contribute to the knowledge of early star and galaxy formation, the evolution of clusters, cluster gaseous cores and the physical processes in the hot intracluster gas. We have estimated the central magnetic field strength of the Hercules A cluster obtained by model fitting very high resolution multifrequency VLA data and ROSAT X-ray data using the Faraday rotation technique. We show that the magnetic field depends on the thermal gas density and is expected to decline with radius from the center of the cluster. The cluster itself is poor and probably a non-cooling flow. Its host is a powerful and unique radio galaxy containing dramatic ring-like features instead of hotspots.

14. Janice Hester: "*Ram Pressure Stripping in Clusters & Groups*"
A model is developed describing the ram pressure stripping of a satellite galaxy's outer gas disk. Whether ram pressure stripping occurs is found to depend primarily on the ratio of the satellite galaxy mass to the mass of the host group or cluster. The model is compared to observations of HI disks from the literature, and the signature of stripping is found in the g-r colors of galaxies in the SDSS.

15. Robert Juncosa: "*Searching for Clusters at high Redshifts*"
Clusters of galaxies provide crucial information to understand both galaxy and cluster formation and evolution. We have developed a code to detect galaxy clusters, based on photometric redshifts; it has been test against known clusters, and then we have used it to detect a few new cluster candidates, at low redshift (z~0.3). We expect to use the method up to redshift ~1.0, to detect high redshift clusters.

16. Manfred Georg Kitzbichler: "*Millennium Mock Galaxy Catalogs:*Semi-Analytic Galaxies on a Lightcone from the Millennium Simulation"
Building on the largest dark matter only simulation so far undertaken and a state of the art semi-analytic galaxy formation model, several mock galaxy catalogs are produced. Since the geometry can be chosen freely, ranging from a very deep pencil beam lightcone out to redshifts beyond z=6 to a shallow 2dF or SDSS like setup, comparison to a wide range of observational surveys is possible. Here a couple of preliminary results illustrating some of the potentials of the latest semi-analytic mock catalogs are presented, concentrating on the evolution of galaxy properties out to higher redshifts.

17. Anja von der Linden: *News from the Dark Clump near Abell 1942*
Weak lensing surveys provide the possibility of identifying dark matter halos based on their total matter content rather than just the luminous matter content. On the basis of two sets of observations carried out with the CFHT, Erben et al. (2000) presented the first candidate (Dark Clump), i.e. a dark matter concentration identified by its significant weak lensing signal without a corresponding galaxy overdensity or X-ray emission. We present a set of HST mosaic observations which confirms the presence of an alignment signal at the Dark Clump position. The signal strength, however, is weaker than in the ground-based data. It is therefore still unclear whether the signal is caused by a lensing mass or is just a chance alignment. We also present Chandra observations of the Dark Clump, which fail to reveal any significant extended emission. A comparison of the ellipticity measurements from

the space-based HST data and the ground-based CFHT data shows a remarkable agreement on average, demonstrating that weak lensing studies from high-quality ground-based observations yield reliable results.

18. R. Pérez Martínez et al.: *ISO's Contribution to the study of Clusters of Galaxies.*
We present the development of knowledge of the infrared and associated physical properties of galaxy clusters through the era of space borne telescopes. ISO made importat advances in the study of nearby and distant clusters, such as the discovery of a major cold dust component on Virgo and Coma or the correlation between dust emission and Hubble type. A detailed study of two specific clusters, A2218 and CL0024+1664 is presented as an example of what can be achieved in intermediate redshift clusters with ISO, while a deeper study of further galaxy clusters will require the contribution of new telescopes like Spitzer.

19. Ana Laura O'Mill: *"Galaxy environment with photometric redshift"*
By means of photometric redshifts we define the local environment of galaxies at redshifts z<0.3 in the SDSS DR3 data release. In order to characterise environment, we use the projected galaxy density derived from the fifth bright neighbour of each galaxy, within a convenient redshift range and luminosity threshold that allows for uncertainties of photometric estimates.

20. Oxana Nenestyan: *"XMM Newton observations of a complete sample of nearby galaxy clusters"*
Determining the past, present and future of our Universe was and remains the major challenge in cosmology. In the order to achieve this goal, science developed during time few different methods, every of them having its positive features but also drawbacks. In this poster we present our approach in trying to contribute to the solution of this problem using XMM Newton observations of a highly complete and flux limited sample of nearby galaxy clusters (HIFLUGCS).

21. Maria Pereira: *"Radial Alignment of Cluster Galaxies"*
We report the discovery of a statistically significant radial alignment of cluster galaxies in a sample of 85 X-ray selected clusters observed in the Sloan Digital Sky Survey. The tendency for alignment is a robust feature of our sample and does not vary significantly with individual cluster or galaxy properties. Preliminary results for a similar analysis of ACS observations of higher (z~0.5) redshift massive clusters (selected from the MACS sample) will also be presented. We use dynamical arguments to show that a significant fraction of cluster galaxies should be undergoing a parametric tidal resonance that causes their long axes to orient themselves towards the center of the cluster potential, and therefore tentatively ascribe the observed radial alignment to this dynamical effect.

22. Sandrine Pires: *"Multiresolution Applications to Weak Gravitational Lensing"*
Ongoing efforts are made to improve the detection of cosmic shear using existing telescopes and, future instruments dedicated to Weak Lensing survey are planned. But the obtained shear maps are always very much corrupted by noise. And when a shear map is converted into a mass map of the projected mass integrated along the lines of sight, the resulting mass map is blurred by noise. In order to de-noise this

mass map, we have developed a wavelet filtering method dedicated to this application. This method is based on the undecimated isotropic wavelet transform and uses a multi-scale entropy method. We present results obtained on simulated data.

23. Jelle de Plaa. *"Signatures of relativistic electrons and warm thermal emission in cluster X-ray spectra"*
Hot diffuse X-ray emitting gas with a temperature of 10-100 million K dominates the visible mass in clusters of galaxies. Although thermal Bremsstrahlung of the hot gas is the main source of the X-ray emission, also in some clusters additional X-ray emission is detected known as soft- and hard-excess. Several interpretations have been put forward to explain this excess emission. The soft emission might originate from a filamentary Warm-Hot Intergalactic Medium (WHIM) surrounding the cluster of galaxies. However, the soft- and hard excess can also be fitted with non-thermal models. Inverse-Compton scattering of relativistic electrons with Cosmic Microwave Background (CMB) photons can produce X-ray emission which has a power-law spectrum. We present a deep 120 ks observation obtained with XMM-Newton of the typical soft-excess cluster Sersic 159-03. Using the high statistics we discuss the presence of the excess and its possible origin. Finally, we compare our findings with other clusters.

24. Emil Polisensky, Namir E. Kassim, Tracy Clarke, Aaron Cohen, T. Joseph Lazio: *"Cluster Samples with the Long Wavelength Array"*
A fraction of the most energetic mergers of groups and clusters of galaxies in the present-day Universe are marked by cluster halos and relics, which are characterized by diffuse, steep-spectrum emission not associated with any galaxy in the merging cluster. The Long Wavelength Array (LWA), a powerful new instrument of unprecedented resolution and sensitivity from 20-80 MHz, will have the sensitivity at long enough wavelengths to detect potentially thousands of less energetic and more distant mergers. A complete census of diffuse emission in merging clusters would make it possible to not only trace the dark matter potentials which govern mergers, but also to define a non-merging cluster sample which would provide the undisturbed systems necessary to study the dark energy equation of state through determination of the baryonic mass fraction in massive clusters. Basic research in radio astronomy at the Naval Research Lab is supported by the Office of Naval Research.

25. Beth Reid: *"SZ signals in Semi-Analytic Cluster Models"*
X-ray measurements of the intracluster medium indicate a deviation from the gas properties expected in the absence of non-gravitational heating and cooling processes. We use semi-analytic models to gauge the effect of various processes and parameters on the Sunyaev-Zeldovich (SZ) effect profiles. We find the integrated SZ cluster luminosity to be a rather robust measure of the cluster mass.

26. Rubén Sánchez-Janssen: *"Environmental effects on the structural parameters of bright and dwarf galaxies in the Coma cluster"*
We have derived quantitative structural parameters for 116 bright ($M\_B < -18$) and 84 dwarf ($-18 < M\_B < -16$) galaxies in the Coma cluster. For the bright population we have found a correlation between the scales of the disks and the position within the cluster, in the sense that no large disks are found near the center of the cluster or in

high-density environments. In general, the disks of bright spirals in Coma show smaller scale lengths than field galaxies. For spirals a trend between color and position is also found, with the bluest galaxies located at larger projected radii. Dwarf galaxies are divided into dE and dS0 according to their surface brightness profiles. These two populations are photometrically analogous to dwarf galaxies in the Virgo cluster. The correlations between the photometrical parameters show that, while dEs can come from dIrrs or from similar processes as bright Es, the origin of dS0 can be harassed bright late-type spirals.

27. Christopher Añorve-Solano, Omar López-Cruz: "*A Detailed Study of Galaxy Morphologies in Nearby Abell Clusters*"

In this work we examine the morphological classification of galaxies in rich Abell clusters using structural parameters derived from an analysis of the galaxy surface brightness. To this end we use deep CCD cluster images of LOCOS (Low-Redshift Cluster Optical Survey; López-Cruz 2001) and the package GALFIT (Peng et al 2002), which utilizes a two-dimensional bulge+disk model to derive the galaxy structural parameters. The objective of this project is to explore the relationship between environment and the morphology of galaxies.

28. Francisco Leon Tavares, Omar Lopez-Cruz, Antonio Garcia-Barreto: "*Radio Souce Counts in Clusters of Galaxies: The Incidence of AGN and Star Forming Galaxies* "

We have cross-matched radio with optical data to study the optical-radio properties and the radial distribution of radio galaxies in clusters. Our cluster sample is subdivided in groups of different richness, Rood-Sastry and Bautz-Morgan types. We use the radio-luminosity as a statistical indicator of AGN or star-formation activity. We also seek to obtain some clues on radio-galaxies evolution in clusters. For our study we used optical data from the LOCOS (Low Redshift Cluster Optical Survey, Lopez-Cruz 2001) database and radio data from the two largest-scale radio surveys at 1.4 GHz: NRAO VLA Sky Survey and NRAO VLA FIRST Survey .

29. Tomas Verdugo, Guillermo Manjarrez, Mario De Leo & José A. de Diego "*Observing galaxies lensed by a cluster of galaxies with GTC-OSIRIS*"

In this work we discuss the detection of high redshift, low luminosity galaxies through the gravitational amplification effect due to the mass in the core of a cluster of galaxies. We calculate the positions and magnifications in the image plane, and their detectability, convolving the images with the instrumental response of OSIRIS-GTC.

30. Norbert Werner: "*A Deep Look on the Cluster of Galaxies 2A 0335+096 with XMM-Newton*"

We present here the results of a deep (130 ks) XMM-Newton observation of the cluster of galaxies 2A 0335+096. The deep exposure allows us to study in detail the temperature structure and the elemental abundances. We find that the abundance structure of the cluster is consistent with a scenario where the relative number of Type Ia supernovae contributing to the enrichment of the intra-cluster medium is ~25%, while the relative number of Type II supernovae is ~75%. Population III stars are not necessary to explain the observed abundance patterns, although their role in the enrichment history cannot be excluded. Both the temperature and iron abundance maps show an asymmetry in the direction of the elongated morphology

of the surface brightness, suggesting that the cluster is in the process of a merger with a subcluster. Moreover, we find that the blobs or filaments discovered in the core of the cluster by Chandra are, contrary to the previous results, colder than the ambient gas, which indicates that they may be the remains of a disturbed cooling core.

31. Jeff F. Wagg, David J Wilner, Roberto Neri, Dennis Downes and Tommy Wiklind: "*Detection of HCN(5-4) in APM08279+5255*"

We present high angular resolution, mm-wavelength observations of the ultra-luminous (far-infrared luminosity of approximately 10^{14} L_o), broad absorption line quasar, APM08279+5255. These data represent the latest results from an ongoing campaign using the Plateau de Bure Interferometer to search for dust and molecules in this redshift 3.911, lensed quasar. We compare the characteristics of the HCN(5-4) emission (luminosity, line-width) with that of the CO(9-8) and CO(4-3) lines detected by Downes et al. (1999).

32. Teffi Schneider, E. Valentijn, R. van de Weijgaert: " *Getting on the Outskirts of Hercules*"

The Hercules supercluster is a relatively compact and nearby supercluster consisting of 3 Abell clusters at z~0.04. It has an enormous range in environmental conditions, containing both a young open cluster consisting mostly of spirals, and a relaxed cluster containing mostly ellipticals. Dynamically it is also very interesting because the third cluster has a large velocity dispersion compared to the other two and seems to be on a collision course with the young open cluster.

Covering only 9 square degrees of the sky the Hercules supercluster seems perfect for a coordinated multi-wavelength study and can be mapped fast and deep with the new *OmegaCam* camera. While most previous studies, usually challenged by the large spatial and angular size of such a superstructure, concentrated mostly on the individual clusters, *OmegaCam* is regarded as the ideal instrument for a more systematic and integrated approach including outlying low galaxy density environments and the intriguing dilute supercluster pervading medium.

This poster presents the plans of observation and scientific goals we wish to achieve within this program. Furthermore we give an overview of the data already available in the different wavelengths.

33. Phillipe Salome: "*Observing Molecular line emissions to probe Cooling flows*"

Many clusters of galaxies are known to harbor a strong cooling flow in their center. The recent Xray data from the satellites Chandra and XMM-Newton have revealed the complex structure of the intracluster medium (ICM) and pointed out the necessity of some reheating mechanisms. I will present here the results of the search of CO emission lines that could trace the cold gas residual expected in a cooling flow scenario. Using the IRAM facilities, we have detected and imaged a very cold gas component in several cooling flow clusters cores. The cold gas is associated with H filaments often surrounding the central cluster cD galaxy. This very cold gas has a peculiar morphology and dynamics that suggest we are indeed observing the cold counterpart of a cooling flow event. These first images of cold gas emissions around the central cluster galaxy open a new window to study the cooling flow phenomenon with the present and the future mm interferometers.