We present our results and compare them to other measurements of the density of the environment of galaxies, such as those in the MaxBCG catalogue of brightest cluster galaxies. As a control of our method, we apply it to a sample of galaxies from the 2MIG catalogue of isolated galaxies, and also to a sample of galaxies from a compilation of members of Abell clusters. We aim to use our results to test the morphology–local density relation and to study the relationship between the different types of emission-line activity of galaxies and their ambient density.

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## GALAXY MODEL IN INFRARED

P. Polido[1] and F. Jablonski[1]

We present in this work a new approach to the derivation of galactic parameters via the star counts method. It uses a modern version of the model of Ortiz & Lépine (1993) and the 2MASS data in J, H and $K_S$ to estimate, based on a regular grid of lines-of-sight over the whole sky, the most important structural parameters of the Galaxy. It is the first time that the star counts method is used in the whole sky, including the complex region of the galactic plane. We have used a conservative approach to derive parameter values and their uncertainties, and also investigate the effects of using several limiting magnitudes over the best set of parameters which describes the Galaxy. Since the landscape for the figure of merit of a model can be pretty complex when we have a number of free parameters in excess of a dozen, the Markov Chain Monte Carlo method looks like ideal for an overview of the parameter space, to constrain regions of interest for further exploration and to provide realistic uncertainties. The pinpointing of the best parameter values is carried out with the Nested Sampling method, very robust in terms of progression to the optimum solution of a multi-parameter model.

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## BAR AND SPIRAL ARMS DYNAMICS IN NUMERICAL SIMULATIONS

I. Puerari[1] and I. Rodrigues[2]

We present the results of SPH simulations with multi-million particles models. The models were constructed with an exponential disk, Spitzer's isothermal sheet in the vertical direction and a NFW halo. In models having a bulge, a spherical Hernquist profile was used. The models were evolved for approximately 5 Gyr using Gadget 2. We present 1D and 2D Fourier analysis to quantify bar characteristics as length, strength, and pattern speeds. Fourier 2D analysis is also applied to show the effects of the swing amplification mechanism. Indeed, the density waves begin to be amplified as tightly wound leading spirals and unwound to open leading structures. Afterwards, the waves wound into trailing patterns, reach their maximum amplitude and finally, fade away as tightly wound trailing spirals. The timescale for each wave packet is of the order of some $10^8$ years.

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## PHYSICAL PARAMETERS OF GALAXIES WITH STAR FORMATION THROUGH MID-INFRARED SED MODELS

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We present a mid-infrared study of a sample of 19 Starburst galaxies in the local (z<0.2) universe. We derive physical parameters such as Metallicity, Interstellar Medium Pressure, Compactness Parameter $C$ (related to the dust heating flux), PDR Fraction $f_{PDR}$ and Extinction $A_V$ by fitting the Spitzer-IRS spectra of these systems using state-of-the-art radiative transfer models and Bayesian techniques. Our results are fundamental in the understanding of massive star formation in the local counterparts of intermediate and high redshift Ultra Luminous Infrared Galaxies (ULIRGs). We reconstruct the star forming histories of these systems by obtaining posterior probability distribution functions (PDFs) for the star formation rates in different epochs an estimate the contribution to the bolometric luminosity from very recent (< 1 Myr) star formation events, and the contribution of Polycyclic Aromatic Hydrocarbons, which is significant in some cases. By comparing the derived PDFs with particular spectral

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signatures, such as the nebular emission of atomic species like [NeII] and [NeIII], and the $H_2$ temperatures we also relate the global pattern of star formation in Starburst galaxies with the internal physics of the ISM.

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## DISK MASS-TO-LIGHT RATIO THROUGH STELLAR POPULATION SYNTHESIS: DARK MATTER CONTENT OF NGC 5278

P. Repetto[1], E. Martínez-García[2], M. Rosado[3], and R. F. Gabbasov[3]

We extended the study on the mass distribution of the spiral galaxy NGC 5278, obtaining the 2D mass distribution of the stellar disk of NGC 5278 using broad band photometric observations and stellar population synthesis models. We performed the rotation curve (RC) decomposition of NGC 5278, subtracting the extracted baryonic disk from the observed RC and fitting only the dark matter RC with four density profiles of dark matter (DM) halos: Hernquist (HH), Burkert (BH), Navarro, Frenk and White (NFW) and Einasto (EH). The main results of this work were that the HH DM halo better fitted the DM RC of NGC 5278 in the case of disk mass $M_d = 5.6 \times 10^{10} M_\odot$ and less 30% of this value, and also that the cored ($n < 4$) EH DM halo better fitted the DM RC of NGC 5278 in the case of more 30% disk mass.

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## DETERMINATION OF HALO OCCUPATION DISTRIBUTION

F. Rodriguez[1], M. A. Sgró[1], and M. Merchán[1]

In this work, we propose a new method to calculate the Halo Occupation Distribution (HOD). It consist of subtract galaxies that are in front or behind the group (background galaxies), but, for projection effects, seem to belong to this. This allows to combine spectroscopic information from catalogs of galaxy groups with photometric information from catalogs of galaxies, the main advantage of this is the possibility to estimate the HOD in more ranges of absolute magnitudes. To evaluate the procedure, we used mock catalogs of galaxies and groups constructed with an imposed HOD. We compare this fiducial HOD with the obtained results by applying our method. Finally, we implement background subtraction in the Sloan Digital Sky Survey DR7, compare to the results of Yang et al. (2008) and calculate the HOD in other ranges of absolute magnitudes.

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## THE DENSE GAS IN M82

P. Salas[1], G. Galaz[1], D. Salter[2], A. Bolatto[2], and R. Herrera-Camus[2]

Galactic winds are responsible of carrying energy and matter from the inner regions of galaxies to the outer regions, even reaching the intergalactic medium. This process removes gas from the inner regions, the available material to form stars. How and in which amount these winds remove gas from galaxies plays an important role in galaxy evolution. To study this effect we have obtained 3 mm maps of dense gas ($n_{\rm crit} > 10^4$ cm$^{-3}$) in the central region of the starburst galaxy M82. We detect line emission from the dense molecular gas tracers HCN, $HCO^+$, HNC, CS, $HC_3N$ and $C_6H$. Our maps reveal a considerable amount of $HCO^+$ emission extending above and bellow the central star-forming disk, indicating that the dense gas is entangled in the outflow. The mass of molecular Hydrogen outside the central starburst is $M_{\rm out} \approx 3 \pm 1 \times 10^6$ M$_\odot$, while in the central starburst is $M_{\rm disk} \approx 8 \pm 2 \times 10^6$ M$_\odot$. These maps also show variations of the amount of dense gas over the starburst disk, revealing that the gas is more concentrated towards the center of the starburst and less towards the edges. It is the average amount of dense gas what drives the observed star formation law between dense gas and star formation rate on galactic scales.