

AM 2217-490: A POLAR RING GALAXY UNDER CONSTRUCTION

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This work is part of a series of case studies of Polar Ring Galaxies (PRGs) (see also Posters GAL-1: 163, GAL-2: 178). A PRG is formed by an early type host galaxy (e.g. lenticular or elliptical), surrounded by a ring of gas and stars orbiting approximately at the polar plane of the host galaxy. AM2217-490 is an interesting case of PRG in formation, with a still asymmetrical ring that surrounds the host galaxy. Apparently, this bluish structure (characteristic of the rings of PRGs), is not yet in equilibrium with the host galaxy. This study is based on spectra on the range 6250–7250 Å obtained with the CTIO 1.5 m telescope - Chile. From them, we measure a heliocentric radial velocity of 9152 ± 18 km/s. The value of the ionization parameter ($\log U = -3.5$) is similar to that in interacting galaxies (Freitas-Lemes et al. 2013, submitted to MNRAS; and Krabbe et al. 2013, MNRAS Accepted), and lower than that of isolated ones. The electron density shows little variation along the major axis of the host galaxy, and a mean value typical of interacting galaxies. Diagnostic diagrams show that the nuclear region harbors an AGN, following a trend among polar ring galaxies. The low-resolution images of the SDSS show no tails or bridges connecting the galaxy to other objects, however, in a radius of 5 arcmin there are three other galaxies with similar speeds, featuring a group. A plausible hypothesis is that one of these galaxies may have interacted with AM2217-490, donating material to form the ring.

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THE EFFECTS OF INTERACTION ON THE KINEMATICS AND ABUNDANCE OF AM 2229-735

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This observational study is about the effects of interaction on the kinematics and chemical abundance of

the component galaxies of AM 2229-735. This system is formed by a disk galaxy, NED01, and a compact perturbed Sb(s)-like galaxy, NED02, the latter showing a tail and counter-tail arc-shaped feature. This system could be a progenitor of a polar ring galaxy. The sky-projected tail is very luminous and seems to connect the galaxies. Our study was based on BVRI broad band imagery as well as long-slit spectroscopy in the wavelength range 4100–8600 Å. We estimated heliocentric radial velocities of 17518 ± 25 km/s (NED01) and 17326 ± 27 km/s (NED02). Standard diagnostic diagrams were used to classify the main ionizing source of selected emission-line regions. It turns out that all regions are mainly ionized by massive stars. Using two empirical methods, we found that the HII regions in AM2229-735 have high metallicity: $12 + \log(O/H) = 8.3 - 8.6$ dex.

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THE IMPACT OF GAS BULK ROTATION ON THE LYMAN- α LINE

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We present results of radiative transfer calculations to measure the impact of gas bulk rotation on the morphology of the Lyman α line in galaxies. We model a galaxy as a sphere with a homogeneous mixture of dust and hydrogen at a constant temperature. These spheres have a solid-body rotation with maximum velocities in the range $0 - 300$ km s^{-1} and neutral hydrogen optical depths in the range $\tau_H = 10^5 - 10^7$. We also consider two kinds of spatial distribution for the radiation sources with respect to the sphere: central and homogeneous. We find that the line width and the intensity at the line's center increases with rotational velocity. In the case of homogeneously distributed sources, for large rotational velocities the line transforms from a double peak to a single peak at the line center. Under the same conditions the escape fraction increases $\sim 30\%$. For radiation sources located off-center, the line morphology presents a range of single, double and triple peaked

lines. We show how these results are useful to interpret recent spectroscopic results of distant $z \sim 2 - 3$ star forming galaxies.

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PHOTOMETRY AND DYNAMICS OF THE MINOR MERGER AM 1219-430 WITH GEMINI GMOS-S

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This work is based on r' and g' images and long-slit spectra obtained with the GMOS at the Gemini South Telescope. We detected a tidal tail in the main galaxy (AM 1219A) and a bridge of material connecting the galaxies. The surface brightness profile of AM 1219A was decomposed into bulge and disc components. The profile shows a light excess of $\sim 53\%$ due to the contribution of star-forming regions. On the other hand, the surface brightness profile of the secondary galaxy shows a lens structure in addition to the bulge and disc. The rotation curve of AM 1219A is quite asymmetric, suggesting a gas perturbed by interaction. The overall best-fitting solution for the mass distribution of AM 1219A was found with M/L for bulge and disc of $\Upsilon_b = 2.8^{+0.4}_{-0.4}$ and $\Upsilon_d = 2.4^{+0.3}_{-0.2}$, respectively, and a NFW profile of $M_{200} = 2.0^{+0.5}_{-0.4} \times 10^{12} M_{\odot}$ and $c = 16.0^{+1.2}_{-1.1}$.

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PHYSICAL PROPERTIES OF GALAXIES IN THE SLOAN DIGITAL SKY SURVEY DETECTED IN INFRARED

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The extragalactic astrophysics is experiencing a golden age with the availability of an almost inconceivable amount of observational data and projects in different spectral regions. Our research group at UFSC, in collaboration with other researchers from Brazil and France, was successful in following these new challenges, especially with the spectroscopic analysis of the SDSS data. The result of this effort was to build a database of physical properties of galaxies to nearly 1 million objects, which is completely public. Recently we also started analyzing data from the GALEX ultraviolet, spectral broadening our coverage. In this work, we continue this expansion, focusing our attention in the infrared region of the electromagnetic spectrum with the inclusion of font catalogs obtained a recently mission, the WISE project. We increase our database with the data obtained from the WISE and made the match in the catalog of creating a subsample of SDSS galaxies about 300 000 objects. These objects are analyzed using a new computational tools in order to identify the properties in the infrared. This is done in conjunction with the Department of Computer Science of Santa Catarina Federal Institute. In the first analysis, we obtain a clear separation between star forming galaxies (SF) and “retired” galaxies (RT). In this work, we present the latest results of the analysis of this data.

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STAR FORMATION RATES OF DS GALAXIES

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The Star Formation Rate of a sample of nine dwarf spiral galaxies and ten late-type Sm is determined from the $H\alpha$ luminosity. The main interest was to check if these two kind of late-type galaxies have similar SFR or not. The images were acquired at the 1.5m telescope of the SPM-OAN and they were reduced with the software MIDAS. The values of the SFR are very similar for both type of galaxies and also similar to other Sm galaxies. The main result is that the dwarf spiral galaxies are more efficient when forming stars than the Sm galaxies because the SFR