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TWO-DIMENSIONAL KINEMATICS OF THE CENTRAL REGION OF NGC 2110

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We present a two-dimensional mapping of the central region of the active galaxy NGC 2110, using K-band integral field spectroscopy with the Gemini NIFS at a spatial resolution of ≈ 25 pc. We present flux distributions and kinematics for the molecular and ionized gas emission lines, as well as the stellar kinematics. The maps for the kinematics and flux distributions of the emitting gas for NGC 2110 were obtained by fitting the $H_2\,\lambda\,2.1218\,\mu$m and H I $\lambda\,2.1661\,\mu$m emission-line profiles by Gauss-Hermite series. The H_2 presents extended emission in the whole field of observation, while the Brγ is extended only to the southeast – northwest direction. The H_2 emission is consistent with emission of gas excited by thermal processes, such as gas heated by X-rays from the AGN or shocks. We estimated an excitation temperature of $\approx\ 2100 - 2700$ K for H_2 emitting gas. The gas velocity fields present a similar rotation pattern than those observed for the stars. In addition, the H_2 velocity field presents other kinematic components. Two spiral structures are observed in blueshifts to the north of the nucleus and redshifts to the south of it. If these kinematic structures are originated from emission of gas located in the plane of the galaxy, they can be interpreted as gas flows towards the nucleus (inflows) of the galaxy. In this case, the mass inflow rate is estimated to be $\approx 4.1 \times 10^{-4}\,M_\odot\,yr^{-1}$. Another kinematic component observed for H_2 emitting gas was interpreted as an ejection of gas from the nucleus (outflows) within a bi-cone with a mass outflow rate of $\approx 4.6 \times 10^{-4}\,M_\odot\,yr^{-1}$.

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UNVEILING THE LINER NATURE OF NGC1052

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NGC 1052 is an E4 galaxy and classified as a typical LINER harboring a stellar rotating disk. However, the central region is spectroscopically unusual with broad optical emission lines, the nature of its emission line gas remains unclear. According to recent studies NGC 1052 exhibit Hα luminosities an order of magnitude above that estimated for an evolved population of extreme horizontal branch stars. Their Hα equivalent widths and optical-to-near infrared (NIR) spectral energy distributions are consistent with them being young stellar clusters aged < 7 Myr, and according to previous works, NGC 1052 may have experienced a merger event about 1 Gyr ago. There are mainly three possibilities to explain LINER's spectra: i) post asymptotic giant branch stars (post-AGB) that ionize their rapidly expanding shells, (ii) active galactic nuclei (AGNs) powered by the in fall of matter into an accretion disk, and (iii) shocks. The stellar population (SP) of AGNs shows an excess of intermediate age stars. Besides, NIR stellar population studies have revealed that the continuum of active galaxies is dominated by the contribution of intermediate age stellar populations. Hot dust emission unresolved is also commonly detected in NIR nuclear spectra of galaxies Seyfert and LINERs. Aimed to discriminate the dominant ionizing source of NGC 1052 we present preliminary results of high spatial resolution integral field spectroscopy, taken with gemini NIFS to map the dominant stellar population, as well as disentangling the featureless and hot dust components.

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GAP FORMATION IN CIRCUMBINARY AGN DISKS

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We numerically study the formation of gaps in circumbinary disks of comparable mass massive black hole binaries ($q \sim 1$). We vary the disk properties (mass, thermodynamics, etc.) and found that most massive and thicker disks are able to prevent the gap formation in them. We contrast our results against analytical models based on the non-axisymetric perturbation enhanced in the disk, which succesfully predicts the disks that opens a gap. We discuss the implications for the occurence of opened and failed gaps in the final separations and posible merging of binary AGNs.

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A NUCLEAR MOLECULAR RING IN MRK1066 REVEALED BY PCA TOMOGRAPHY

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We used the PCA (Principal Component Analysis) tomography technique to analyze J and K band datacubes for the inner $\approx$ 350 pc radius of the Seyfert 2 galaxy Mrk 1066, obtained with the Gemini/NIFS (Near-Infrared Integral-Field Spectrograph) at a spatial resolution of $\approx$ 35 pc. The first eigenvector is dominated by emission from the AGN and host galaxy and corresponds to 95% of the variance of the data. The second eigenvector for the K band presents an anti-correlation between the blue and red wavelengths. In corresponding tomogram, it is observed that the nuclear emission is dominated by red part, and thus we interpret this eigenvector as being due the emission of the dusty torus. A rotating disk is observed in eigenspectrum 2 (in J band) and eigenspectrum 3 (in K band) and their respective tomograms. Correlations among line and radio emission are observed for the next eigenspectrum. Double line profiles are seen in the eigenvector 3 (for the J band) and 4 (K band), probably originated by the interaction of the radio jet with the line-emitting gas. The analysis of the fifth eigenspectrum for the K band and its tomogram shows that the H_2 emission concentrated in two spiral arms originated from a nuclear ring of molecular hydrogen (with radius of ~ 0.2") surrounding the nucleus of the galaxy ring and extend to up to 1.5" from the nucleus to northeast and to southwest. This structure was hot seen in the "traditional" analysis of the cube.

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PHYSICAL PROPERTIES OF FEII EMISSION IN ACTIVE GALACTIC NUCLEI

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Among the spectral lines emitted by the broad line region (BLR) in active galactic nuclei (AGN) the FeII emission is the most prominent one and therefore constitutes one of the most important contributors to the cooling of that region. In the near infrared (NIR) the FeII emission is intense but free of blending effects opening a window to a more consistent analysis of that emission. With the aim of studying the FeII in the range 0.8-1.2 μm in a sample of 21 AGNs we utilize a semi-empirical template obtained from IZw1, which is considered the prototype of FeII active galaxy emitter. That particular template reproduces accurately the FeII in IZw1 and it is now applied, by the first time in other AGNs. In this work we made a analysis of the width and intensity of the FeII lines in order to derive the most probable location of the emitting region and to study the formation mechanisms of that ion, respectively. We compare the width of the individual FeII lines with that of other lines emitted in BLR. Our results show that the FWHM of iron systematically approaches to that of OI and CaII and is considerably smaller than that of Hydrogen, confirming previous assumptions that the gas responsible for the FeII emission is the outer portion of the BLR. We correlate the strength of the NIR and optical iron lines to derive the relative contribution of the different mechanisms that produces that emission. We found that in all cases the Lyα fluorescence plays an important role.

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THE ARCHITECTURE OF THE ACTIVE GALACTIC NUCLEUS OF NGC 1068

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