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 ≈ 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 ≈ 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