Astrophysics > Cosmology and Extragalactic Astrophysics

The 1.6 micron near infrared nuclei of 3C radio galaxies: Jets, thermal emission or scattered light?

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Using HST NICMOS 2 observations we have measured 1.6-micron near infrared nuclear luminosities of 100 3CR radio galaxies with z<0.3, by modeling and subtracting the extended emission from the host galaxy. We performed a multi-wavelength statistical analysis (including optical and radio data) of the properties of the nuclei following classification of the objects into FRI and FRII, and LIG (low-ionization galaxies), HIG (high-ionization galaxies) and BLO (broad-lined objects) using the radio morphology and optical spectra, respectively. The correlations among near infrared, optical, and radio nuclear luminosity support the idea that the near infrared nuclear emission of FRIs has a non-thermal origin. Despite the difference in radio morphology, the multi-wavelength properties of FRII LIG nuclei are statistically indistinguishable from those of FRIs, an indication of a common structure of the central engine. All BLOs show an unresolved near infrared nucleus and a large near infrared excess with respect to FRII LIGs and FRIs of equal radio core luminosity. This requires the presence of an additional (and dominant) component other than the non-thermal light. Considering the shape of their spectral energy distribution, we ascribe the origin of their near infrared light to hot circumnuclear dust. A near infrared excess is also found in HIGs, but their nuclei are substantially fainter than those of BLO. This result indicates that substantial obscuration along the line-of-

sight to the nuclei is still present at 1.6 micron. Nonetheless, HIGs nuclei cannot simply be explained in terms of dust obscuration: a significant contribution from light reflected in a circumnuclear scattering region is needed to account for their multiwavelength properties.

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