Nuclear Activity in Galaxies Across Cosmic Time
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Adaptive optics imaging and spectroscopy of the radio galaxy 3C294

Andreas Quirrenbach

Landessternwarte, Zentrum für Astronomie der Universität Heidelberg, Königstuhl 12, 69117 Heidelberg, Germany

Abstract. 3C 294 is a powerful FR II type radio galaxy at z = 1.786. Due to its proximity of a bright star, it has been subject to several adaptive optics supported imaging studies. The system shows a clumpy structure indicative of a merging system. There is even tentative evidence that 3C 294 hosts a dual AGN. In order to distinguish between the various scenarios for 3C 294 we performed deep high-resolution adaptive optics imaging and optical spectroscopy of 3C 294 with the Large Binocular Telescope. We resolve the 3C 294 system in three distinct components separated by a few tenths of an arcsecond. One of them is compact, the other two are extended. The nature of the latter is unclear. They could be a single galaxy with an internal dust absorption feature, a galaxy merger, or two galaxies at different redshifts. We can now uniquely associate the radio source of 3c 294 with one of the extended components. Based on our spectroscopy, we determine a slightly different redshift of z = 1.784. We find, however, in addition a single emission line at a wavelength of 6745 AA, which might be identified with Lyα at z = 4.56. It thus appears unlikely that 3C294 hosts a dual AGN; it might rather be a pair of AGNs with very small projected separation.

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