

Origin of the Gas in the Extended Narrow-Line Region of Nearby Seyfert Galaxies: The Case of Mrk 6

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Abstract. Ionization cones are one of the most important pieces of evidence supporting the AGN unified model (Antonucci & Miller 1985; Urry & Padovani 1995). Until now, the physical processes at work in the cones are not completely understood. A still open question concerns the origin of the gas. To study the origin of the ionized gas, we first selected a sample of nearby ($z < 0.03$) Seyfert galaxies showing extended [O III] $\lambda 5007$ emission. We then observed these galaxies with the MultiPupil Fiber Spectrograph (MPFS) at the 6-m telescope of the Special Astrophysical Observatory (Russia). Here we present very preliminary results on the properties of the narrow-line region (NLR) of the intermediate Seyfert galaxy Mrk 6.

Keywords. galaxies: active, galaxies: Seyfert, galaxies: individual (Mrk 6)

Mrk 6 was observed with MPFS at low resolution (6 Å) and high resolution (3 Å) over the spectral range 3800–7300 Å. The reduced data were analyzed by means of an automatic software, developed by our group, which can fit one or more Gaussian functions to the emission-line profiles. From the output of the code, we reconstructed 2-D maps for flux, velocity, and FWHM for each emission line. The velocity maps show a regular pattern of rotation with the kinematic axis oriented along the minor axis of the galaxy. The [O III] line profile was fitted by means of two Gaussian components: the velocity map of the main component shows a pattern similar to that of other lines, while the second one appears to be rotated by $\sim 30^\circ$. The higher resolution data were obtained with the AGN close to a corner of the field of view in order to analyze the extended and off-centered emission visible in our long-slit spectrum obtained with AFOSC at the Asiago Astrophysical Observatory. The flux map shows extended emission elongated in the northwest direction. The velocity field is in agreement with the previous analysis at lower resolution. We have also obtained and analyzed the 2-D maps of the emission-line ratios and the Veilleux & Osterbrock (1987) diagnostic diagram. We find strong evidence that the main ionization process in the NLR of Mrk 6 is photoionization by the power-law continuum of the AGN. A deeper and more detailed analysis is currently underway.

References

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