

AGN evolution as seen in spectral lines: The case of narrow-line Seyfert 1s

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Abstract. Line profiles can provide fundamental information on the physics of active galactic nuclei (AGN). In the case of narrow-line Seyfert 1 galaxies (NLS1s) this is of particular importance since past studies revealed how their permitted line profiles are well reproduced by a Lorentzian function instead of a Gaussian. This has been explained with different properties of the broad-line region (BLR), which may present more pronounced turbulent motions in NLS1s with respect to other AGN. We investigated the line profiles in a recent large NLS1 sample classified using SDSS, and we divided the sources into two subsamples according to their line shapes, Gaussian or Lorentzian. The line profiles seem to separate all the properties of NLS1s. Black hole mass, Eddington ratio, [OIII] luminosity, and Fe II strength are all very different in the Lorentzian and Gaussian samples, as well as their position on the quasar main sequence. We interpret this in terms of evolution within the class of NLS1s. The Lorentzian sources may be the youngest objects, while Gaussian profiles may be typically associated to more evolved objects. Further detailed spectroscopic studies are needed to fully confirm our hypothesis.

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