

"ON THE BROAD H α COMPONENT OF IC 5063, IC 5135 and NGC 2992"

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As part of a high resolution (0.55Å) spectroscopic survey of southern Seyfert galaxies, we observed a number of objects in the H α region. The main goal of this survey is to study the profiles of the narrow lines in Seyfert 1 and Seyfert 2 galaxies. As a by-product, one can search for and analyse weak broad components in H α that sometimes show up when Seyfert 2 galaxies are observed with high resolution and high signal to noise. Such objects are usually classified as Seyfert 1.8 or 1.9. The search and detailed study of these objects is of great importance for characterizing the weak end of the luminosity function of active galactic nuclei (AGN). The observations were made with a two channel intensified Reticon at the Coude spectrograph of the 1.6m telescope at the Laboratorio Nacional de Astrofisica (CNPq/LNA).

The deblending procedure was as follows: [O III] λ 5007 was taken in velocity space and scaled to the intensity of the [N II] lines by an arbitrary factor so its subtraction from the [N II] lines left a "smooth continuum". The [N II] line intensities were constrained to have a ratio of 2.8. In the case of the galaxy IC 5135, the profile of the [O III] λ 5007 was clearly and significantly different from that of the [N II] lines. Therefore, for this galaxy, we used H β as the matching profile.

From the deblended spectra we have estimated the equivalent width of both narrow and broad components of H α as listed in Table I.

TABLE I

Galaxy	w_n (Å)	w_b (Å)	b/n	FWZI (km/s)
IC 5063	54	39	0.72	3,000
IC 5135	72	125	1.74	3,800
NGC 2992	35	7	0.2	3,200?

The galaxy IC 5063 was studied in detail by Caldwell and Phillips (1981) and by Bergeron et al. (1983). Caldwell and Phillips did not find any evidence for broad H α component, while Bergeron et al. found a broad component with a flux of 0.7 relative to the narrow component, similar to our measurements (those authors found FWHM = 3,200 km/s while we find FWZI = 3,000 km/s).

Previous measurements of NGC 2992 were reported with a much stronger broad H α component (Shuder 1980, Ward et al. 1980, Veron et al. 1980). Shuder reports a ratio of broad-to-narrow-line flux of 0.9 while the other authors found an even stronger broad emission. The forbidden line widths are also significantly narrower in our observations than in previous reports. What is the reason for such a discrepancy? One could argue that the difference in flux is real, perhaps caused by a variability of the broad component or perhaps due to slightly different locations of the slit during the observations. There is a third possibility, which is probably the most plausible explanation for the observed discrepancy: the previous authors used a much poorer resolution than we did. As the lines are quite asymmetric, the deblending with poor resolution (5 Å) is a delicate task. To show the effect of such a resolution on the result of the deblending, we degraded numerically our original spectrum to 4.7 Å resolution. After this we applied the previous deblending procedure. By evaluating the narrow and broad components we get a ratio b/n \sim 1, (like the previous authors did) about 5 times larger than the ratio obtained with full resolution. This shows that to study the profile of narrow emission lines and the weak broad H α components in AGN, high resolution (\sim 1Å) spectra are required.

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DISCUSSION

WHITTLE Were the absolute magnitudes of the galaxies total magnitudes or nuclear magnitudes?

STEINER The absolute magnitudes were taken from the catalog of Véron and Véron. I believe they are mostly 10 to 20 arc sec aperture photometry.