A POSSIBLE FUNDAMENTAL DIFFERENCE BETWEEN RADIO LOUD AND RADIO QUIET AGN

M. CALVANI
Osservatorio Astronomico, Padova, Italia
J.W. SULENTIC AND P. MARZIANI
University of Alabama, Tuscaloosa, USA
D. DULTZIN-HACYAN
Instituto de Astronomía, UNAM, México
AND
M. MOLES
Instituto de Astrofisica de Andalucia, Granada, España

We report on some striking differences between radio loud and quiet emitters that we found in a comparative analysis of the high and low ionization lines for 52 low redshift AGN (31 loud; 21 quiet).

The broad components of CIVλ1549 and Hβ were chosen as representative of the high and low ionization lines respectively. CIVλ1549 observations were obtained with the Faint Object Spectrograph on the HST. They were retrieved from the HST data archive and matching optical spectra for the region of Hβ were obtained at several ground based observatories. Details on observations, narrow/broad component deconvolution and profile cleaning from satellite lines (especially FeII) can be found in Marziani et al. (1995). The rest frame for each quasar was determined from the radial velocity of strong narrow lines, typically [OIII]$\lambda\lambda$4959,5007.

Fig. 1 depicts our results: (1) Radio loud AGN show predominantly redshifted, redward asymmetric Hβ, while CIVλ1549 appears broader but predominantly unshifted and symmetric. (2) Radio quiet AGN, on the contrary, show unshifted and symmetric Hβ, and blueshifted and blue-ward asymmetric CIVλ1549.

Interesting additional results are: (1) The peak (or 3/4 intensity level) radial velocity of Hβ almost always exceeds the radial velocity of CIVλ1549 in both radio quiet and radio loud AGN. (2) There is evidence that *the*

R. Ekers et al. (eds.), Extragalactic Radio Sources, 250–251.

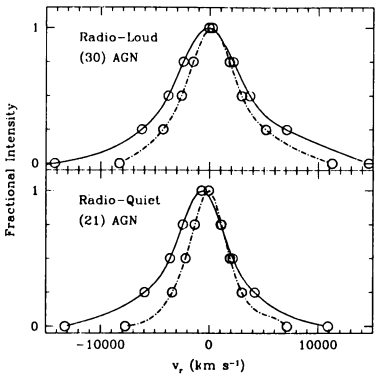

Figure 1. "Median" profiles of Hβ (dot-dashed line), and CIVλ 1549 (solid), for the radio loud quasars in our sample (upper panel) and the radio quiet ones (lower panel). The profiles were built interpolating spline functions to the median values of the radial velocity measured at 0,0.25,0.5,0.75,1.0 peak intensity.

C IVλ*1549 and* Hβ *line profiles are coupled in radio loud AGN.* Peak shifts of C IVλ1549 and Hβ appear to be correlated. FWHM(C IVλ1549) and FWHM (Hβ) are also correlated. The ai(1/4) of C IVλ1549 and Hβ, even if not correlated show a marked tendency to occupy one quadrant in the diagram ai(1/4)(C IVλ1549) versus ai(1/4)(Hβ). None of those trends is revealed for radio quiet quasars. (3) The luminosity of Hβ and C IVλ1549 are strongly correlated.

A number of properties suggest a relationship between line profiles and radio loudness: (1) Superluminal sources tend to have low Hβ equivalent width. *If we restrict our attention to sources with* $\beta_{app} \approx 10$*, the* Hβ *profile is redshifted and redward asymmetric.* (2) The dependence of line profile width on the R (flux of radio core over flux of radio lobe) parameter is the same for both Hβ and C IVλ1549. (3) The shift at the line base appears to be correlated with $L_{\nu,core}$. The largest $L_{\nu,core}$ is associated with the largest zero intensity. (4) The average radio loud quasar is a less efficient FeII radiator than the average radio quiet quasar. There is some indication, however, that core dominated radio sources may have peculiar FeII emission.

Summing up, our results suggest that: (1) C IVλ*1549 and* Hβ *might well be emitted in the same region in radio loud AGN, at variance with radio quiet AGN, where several lines of evidence suggest that* C IVλ*1549 is emitted by out-flowing gas, while* Hβ *is not.* (2) *Radio loudness affects the line profiles.*

References

Marziani, P., Sulentic, J.W., Dultzin-Hacyan, D., Calvani, M. and Moles, M. (1995), *Ap.J. Suppl.*, in press.