



## Abstract

The most recent observations of AGN have been leading investigators to the conclusion that most AGN can be classified according to three main physical characteristics,  $M_{BH}$ ,  $L/L_{Edd}$ , and inclination angle. Using the Greene & Ho (2007) sample of ~8500 nearby broad line AGN spectra from the SDSS, we investigate preliminary correlations between these and other parameters to determine if any strong statistical trends exist. There has also been an ongoing debate over the distribution of radio loudness of AGN and whether or not it is bimodal. Using the FIRST survey we found ~800 objects from the original sample which had corresponding radio fluxes. Using these data, we investigate previous claims for and against bimodality.

### SDSS BL AGN Sample

This sample comes from Jenny Greene from the 2007 Greene & Ho paper (arXiv:0705.0020)

- SDSS DR4 search of all galaxies with  $z < 0.35$
- Sample selected on the basis of detected broad  $H\alpha$
- The final sample of BL AGN has 8,435 objects, all with measured FWHM and luminosity of  $H\alpha$  ( $L_{H\alpha}$ )
- Using the virial black hole mass relation:

$$M_{BH} \propto R_{BLR} v^2 \propto L^{1/2} (FWHM),$$

black hole masses were calculated using  $H\alpha$  luminosity and FWHM (Greene & Ho 2005b)

### FIRST Survey Data

- Object search by R.A. and Dec. from final SDSS BL sample at FIRST website

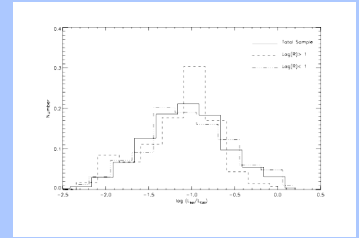
- 832 objects were found to have radio fluxes exceeding the FIRST limiting flux magnitude of 1mJy.

- From the integrated radio flux at 1.4 GHz and optical flux at 5100Å we were able to derive a radio loudness parameter 'R' using:

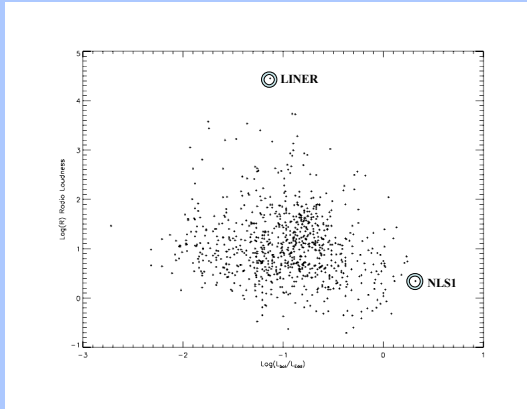
$$R = L_{\nu}(1.4GHz) / L_{\nu}(5100\text{Å}) * (0.3612)$$

The factor at the end is to scale R to the radio flux to the 5GHz frequency of Sikora et al 2007

### Distribution of Eddington Ratios for $R > 10$ (RL) & $R < 10$ (RQ) Objects



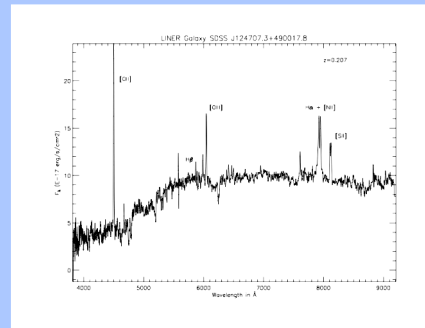
### Radio Loudness vs Eddington Ratio



- No clear separation of RL and RQ like in Sikora et al. 2007
- Parameter space is limited to higher  $L/L_{Edd}$  and we don't sample very RL (radio selected) objects like FRI's

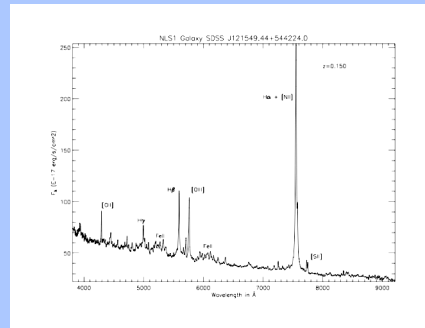
### SDSS DR4 Spectra

#### LINER



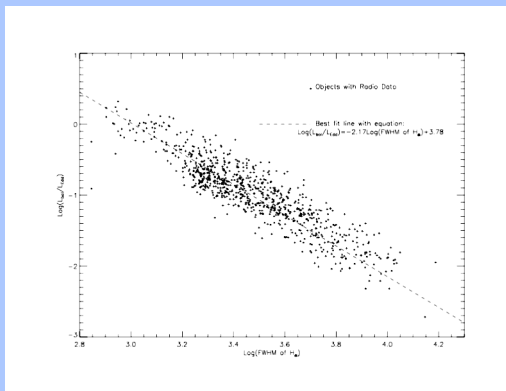
- Unusual: LINERS expected to have lower R and lower  $L/L_{Edd}$

#### NLS1



- This NLS1 has a high  $L/L_{Edd}$  and is RQ as expected

### FWHM vs Eddington Ratio



- Consistent with NLS1/BLS1 claims
- There is no difference in the distribution of the RL and RQ objects
- The significance of this plot must be treated with caution:
  1. The interdependence of parameters and how they are derived:  $L/L_{Edd} \sim L^{1/2} v^2$
  2. Systematic effect due to possible inclination angle of BLR affecting measured FWHM. Selection effect due to limiting magnitude of SDSS

### References

- Greene J. E., & Ho, L. C. 2005b, ApJ, 630, 122
- Greene J. E., & Ho, L. C. 2007, in press (arXiv:0705.0020)
- Sikora M., Stawarz L., Lasota J., 2007, ApJ, 658, 815