The Connection Between Broad Emission Lines Properties and Stellar Velocity Dispersion in Sample of AGNs Type 1

Sladjana Marčeta-Mandić

Astronomical Observatory, Belgrade, Serbia

Jelena Kovačević-Dojčinović,
Luka Č Popović

sladjana@aob.rs

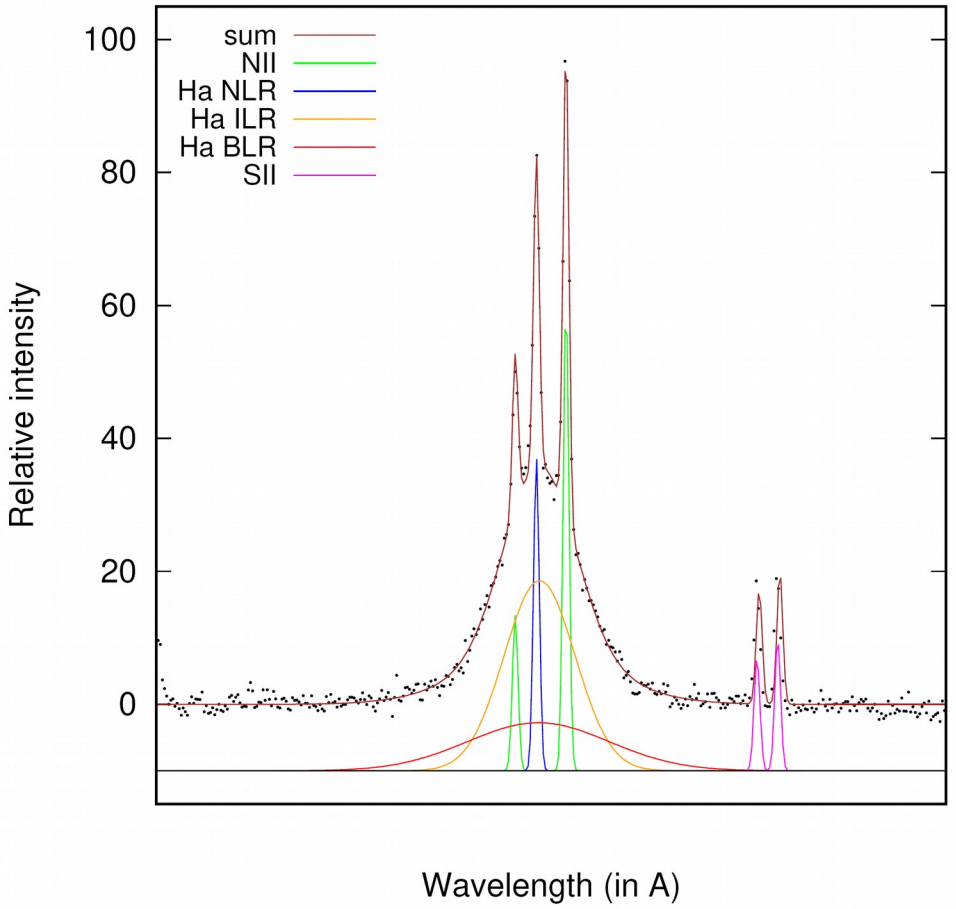
Spectroscopic estimation of SMBH mass

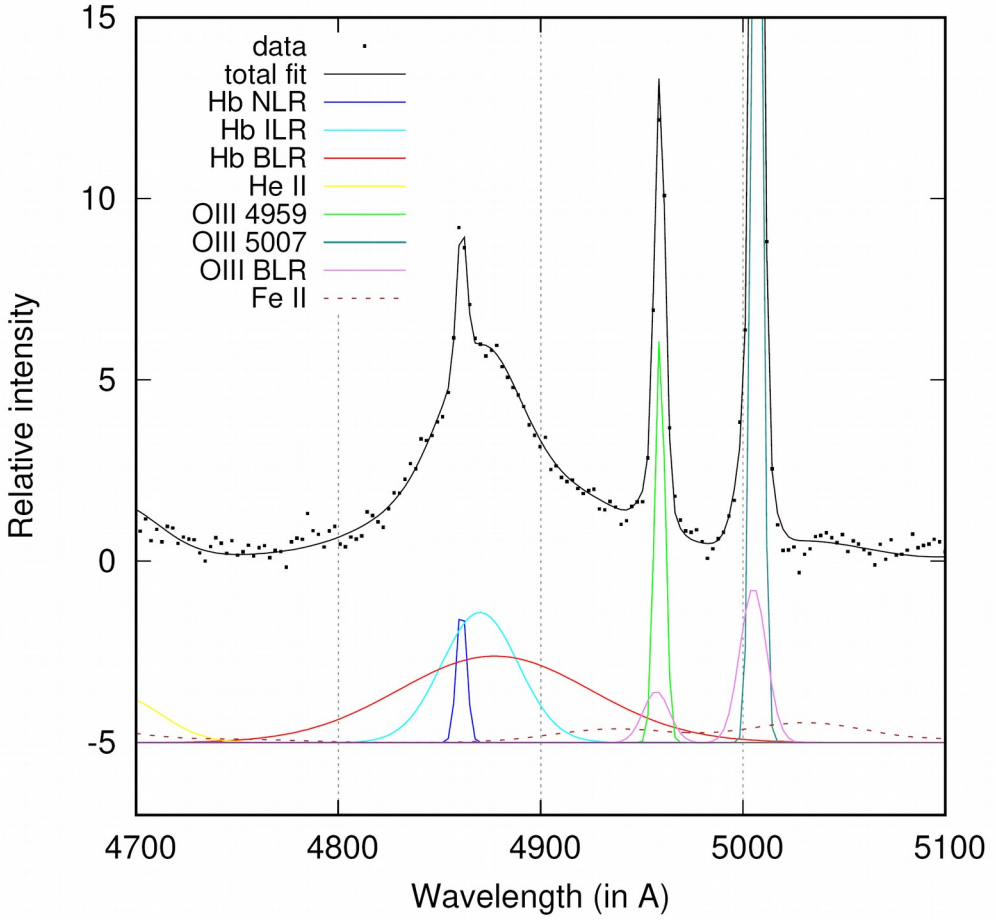
- Several methods for estimating the super-massive black hole (SMBH) mass M_{BH} use spectral properties of AGN emission lines.
- One of the most common method is single-epoch virial method, that uses continuum luminosity at 5100nm + full width at half maximum (FWHM) of the broad Hβ emission line (Peterson, 2014)
- There is an assumption that the broad Hα emission line also could be used for estimation of M_{BH} (Green&Ho, 2005)
- Here we compare virial masses obtained from Hα and Hβ lines, with stellar velocity dispersion (σ*)

Sample and Analysis

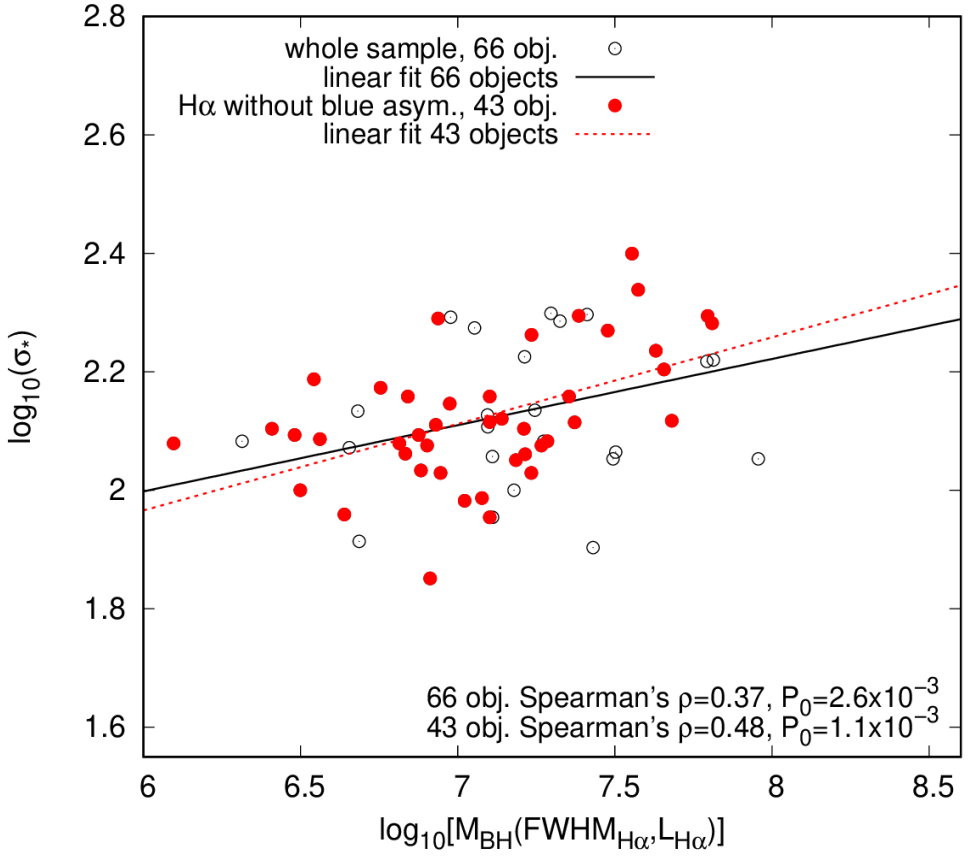
- We used the sample of 66 AGNs Type 1, with available σ*. Spectra were taken from the SDSS, analyzed in Shen+2015 and in Harris+2012

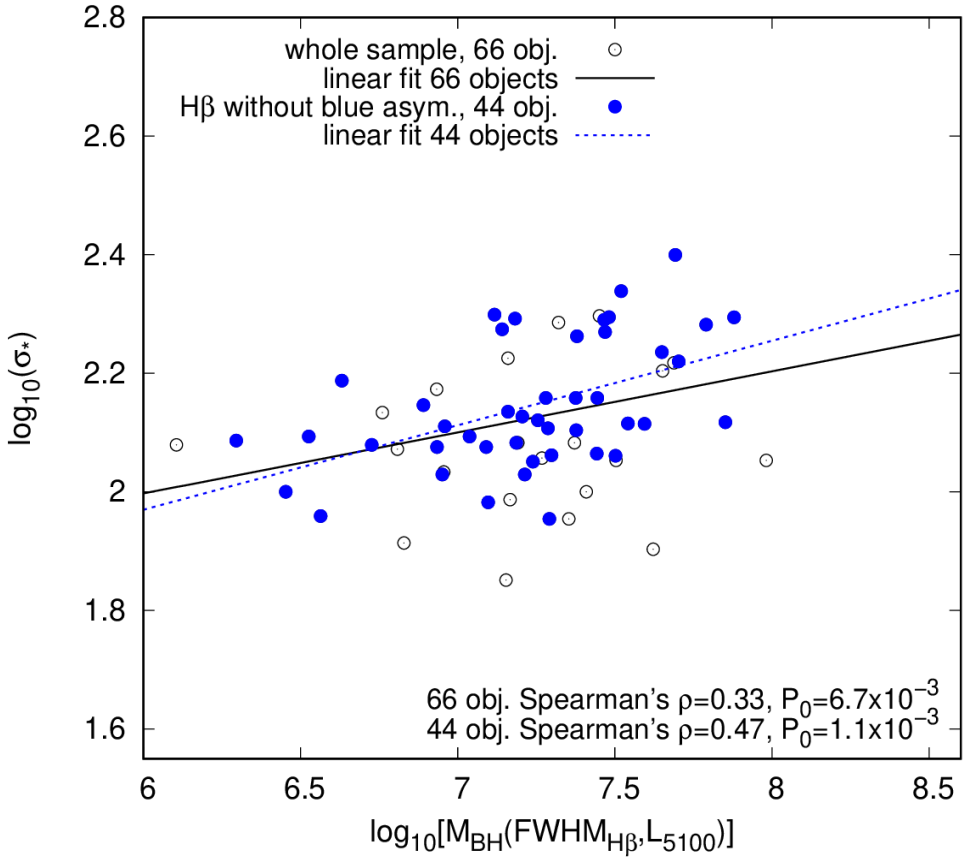
- Spectra were corrected for the Galactic extinction, cosmological redshift, host galaxy contribution, continuum emission and then fitted using the multi-Gaussian model of optical emission (Kovačević+2010)





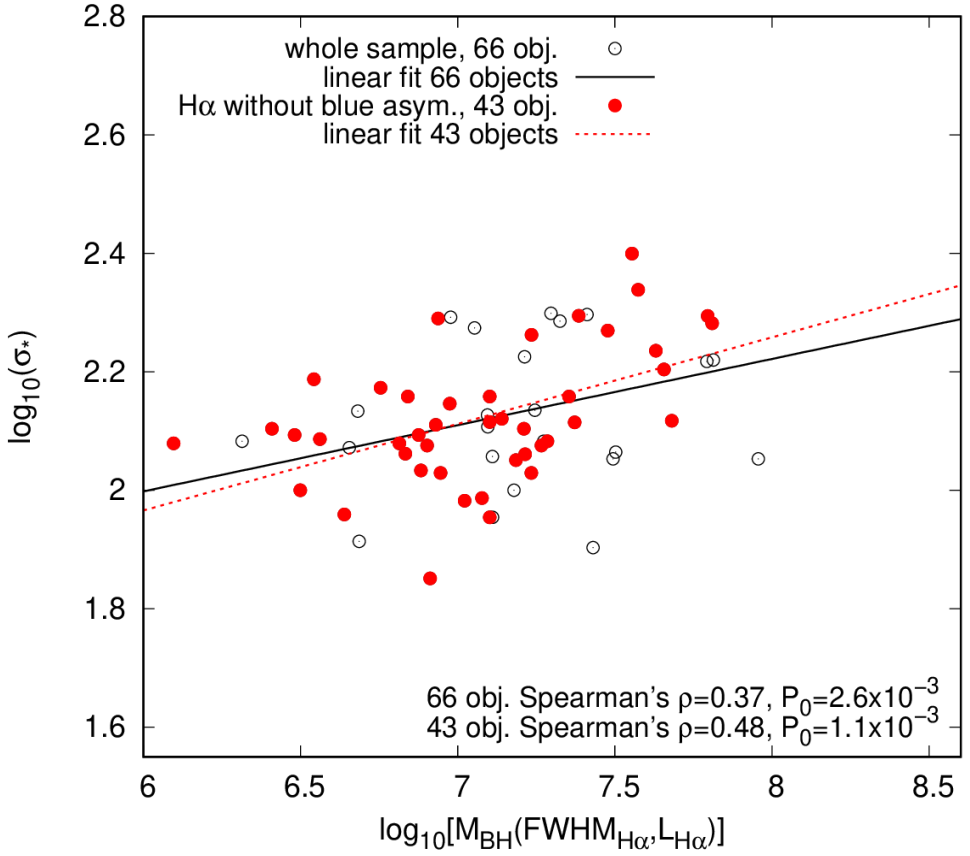
Results

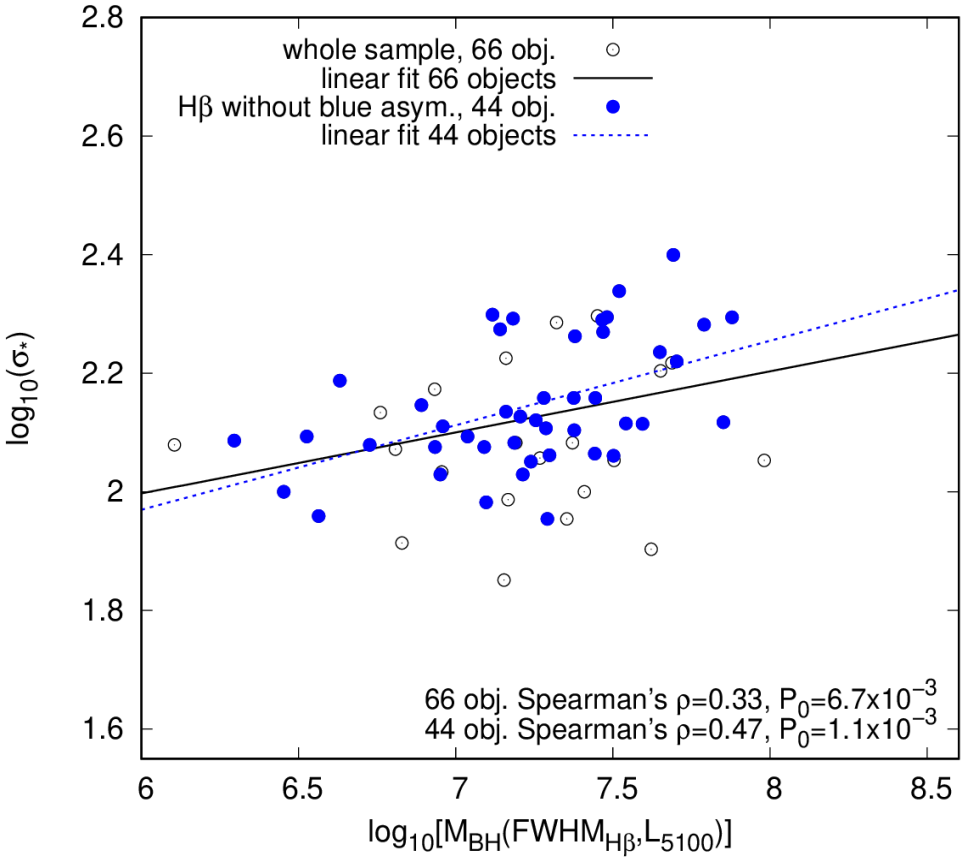




- Here we present comparisons of σ* with virial M_{BH} obtained using Hα (left) and Hβ (right)
- We supposed that blue asymmetry in BEL indicates non gravitational effects, and that removing these object from the sample would improve these correlations. In order to check that, we made subsamples of objects having only red asymmetry in emission lines (full circles).

Conclusions





- We confirmed that parameters of the broad Hα emission line are reliable for M_{BH} determination, as those from Hβ are.

- In both cases, the correlation of σ* and SMBH mass obtained by the virial method, are significantly improved when the objects with blue asymmetry in emission line, were removed from the sample (for Hα from ρ=0.37 to ρ=0.48, $P_0=10^{-3}$, and for the Hβ from ρ=0.33 ρ=0.47 and $P_0=10^{-3}$).

Thank you