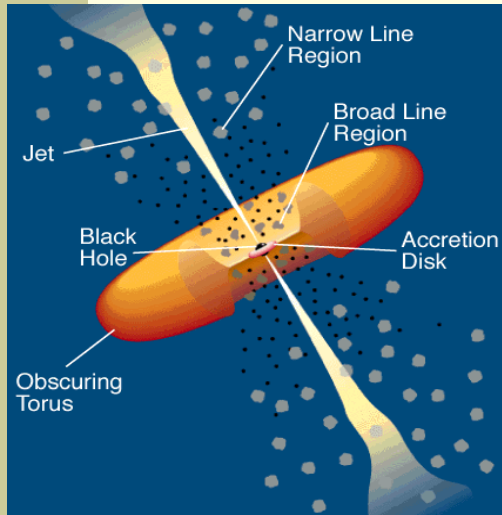

What we can learn from AGN spectra?

Analysis of narrow lines

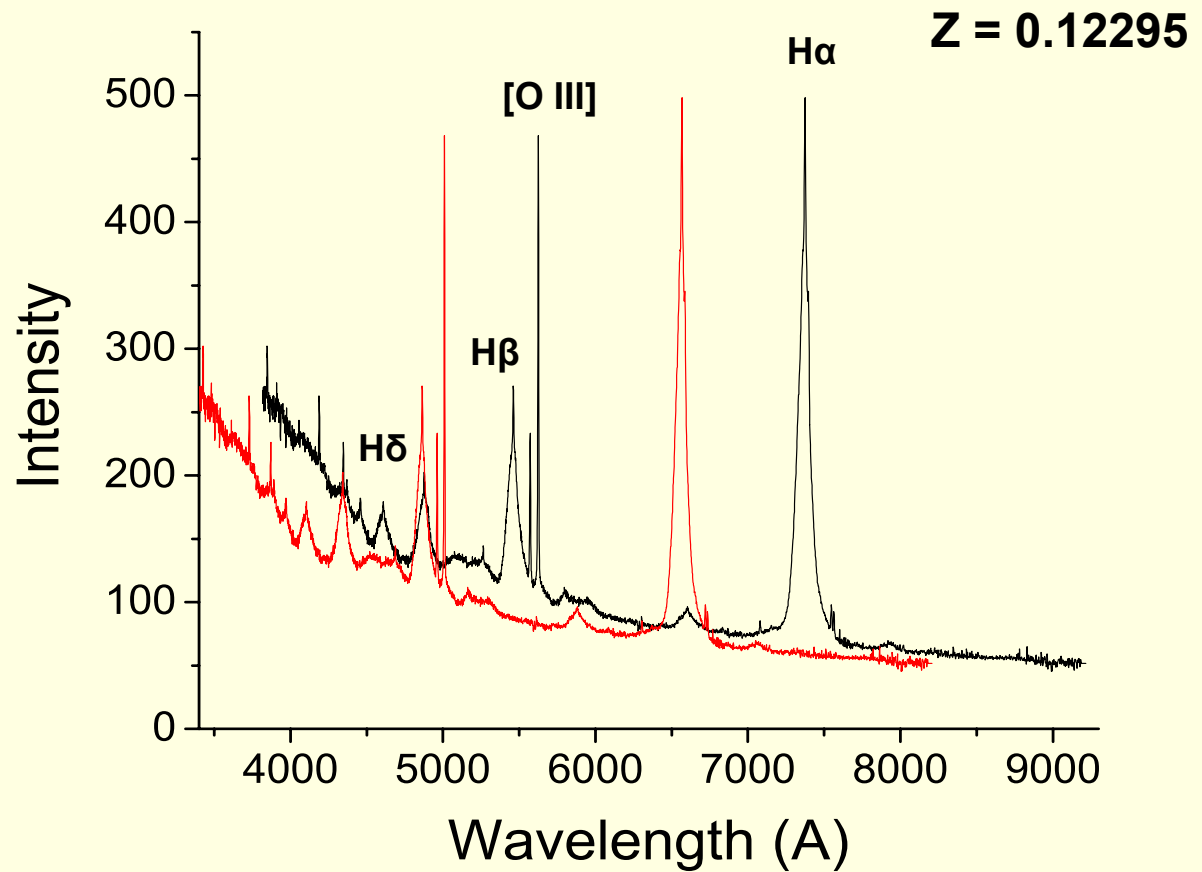
Jelena Kovačević

Astronomical Observatory Belgrade

Removing the cosmological redshift

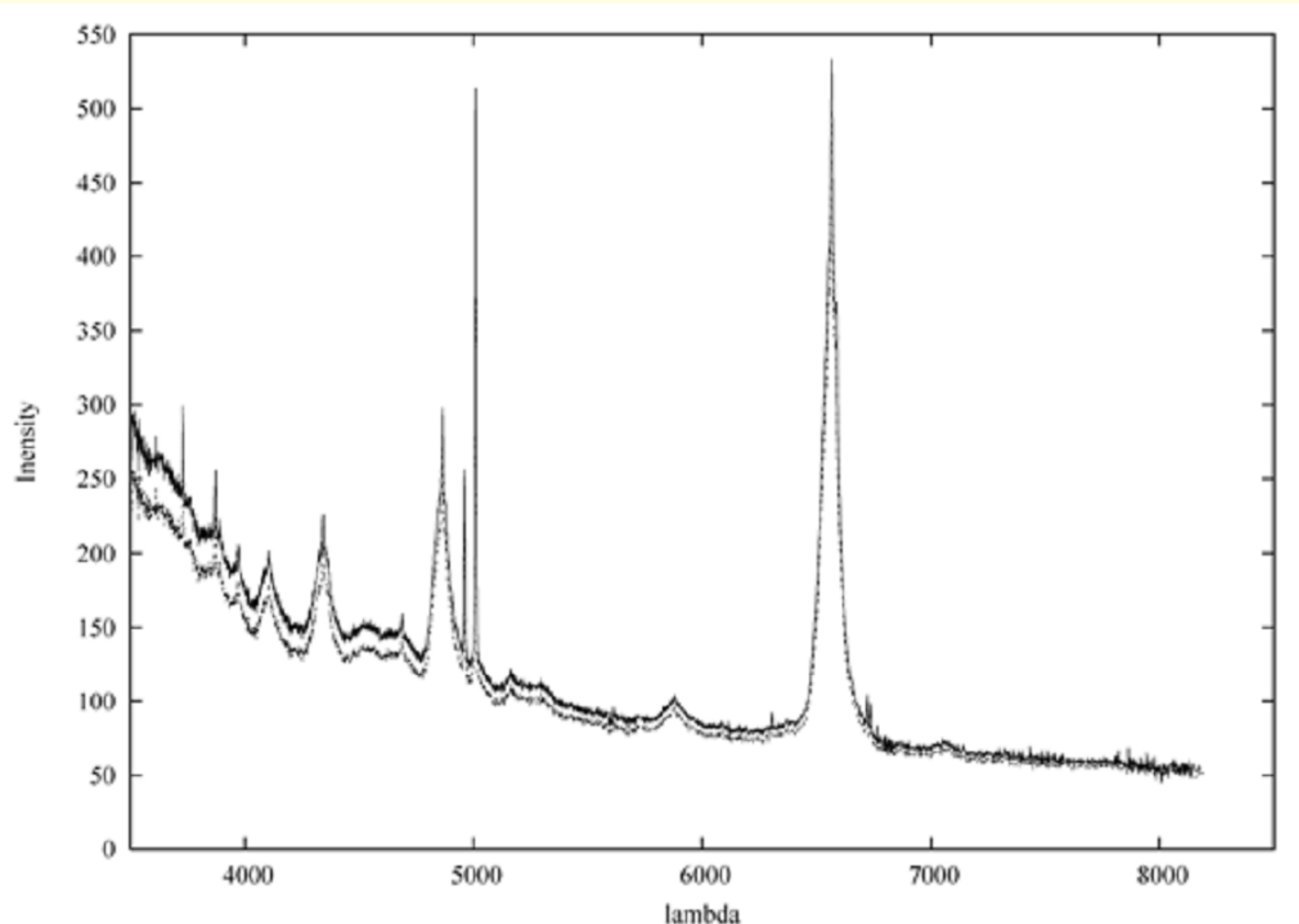
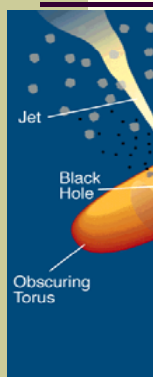


SDSS J091955.35+55330000.00



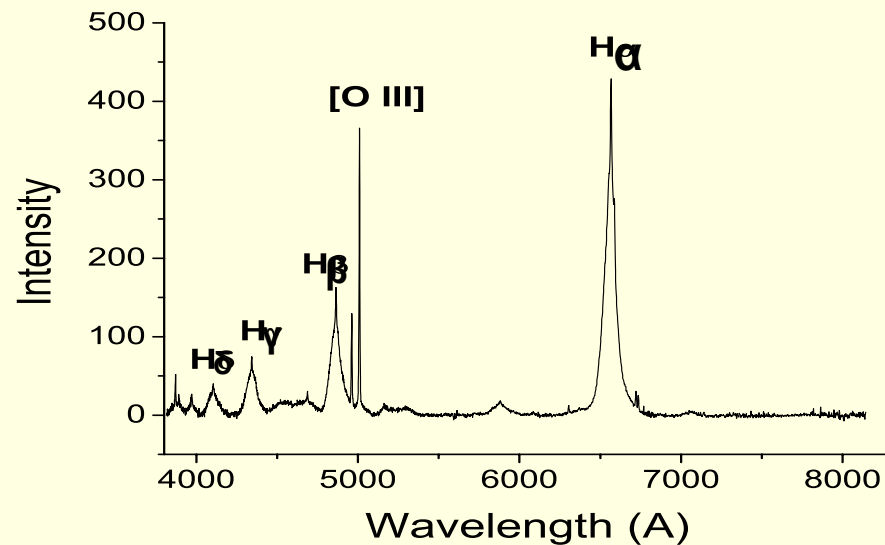
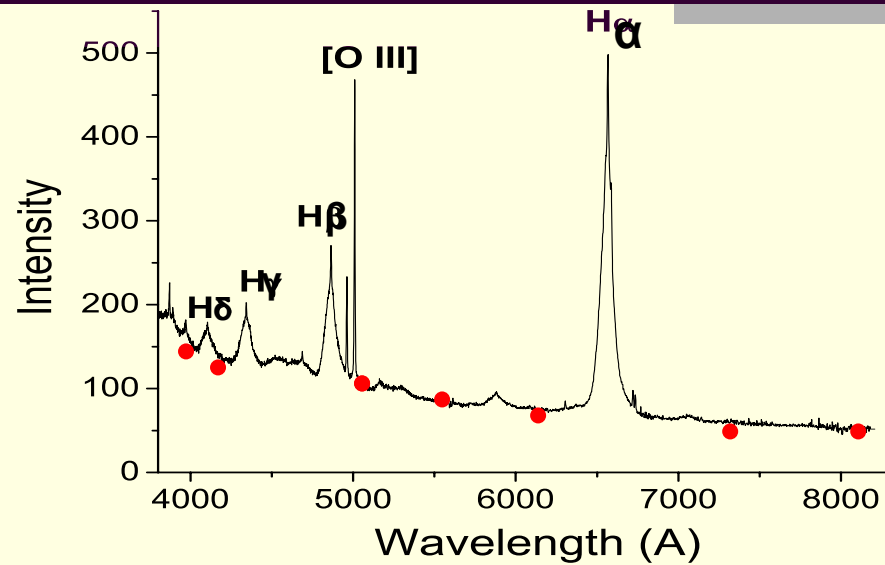
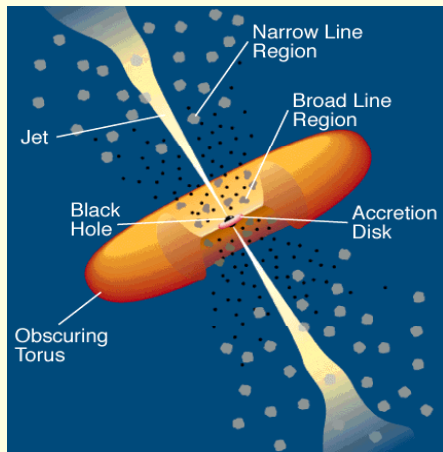
$$z = \left(\frac{\lambda_{obs} - \lambda_o}{\lambda_o} \right) = \frac{V_r}{c}$$

Removing the reddening effect

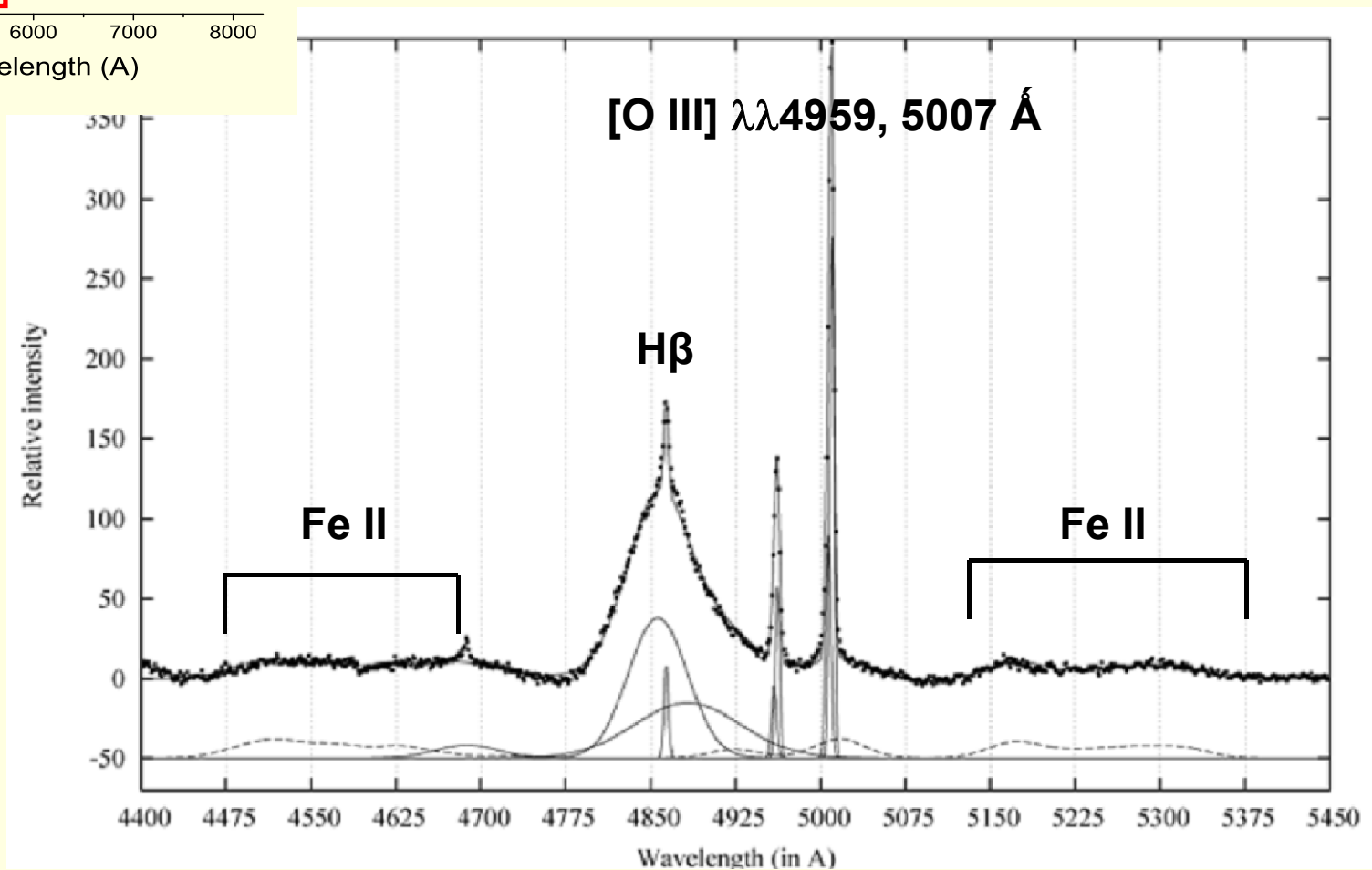
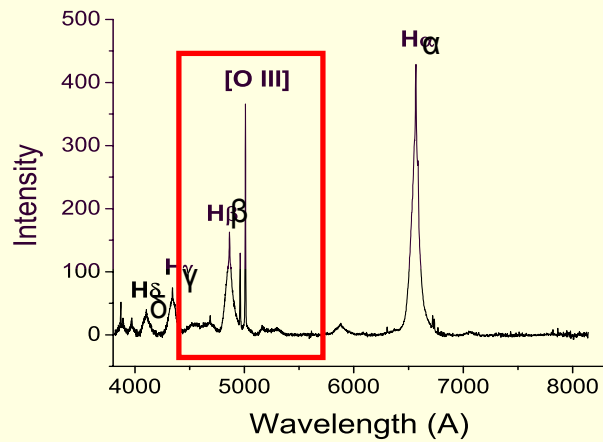


ty

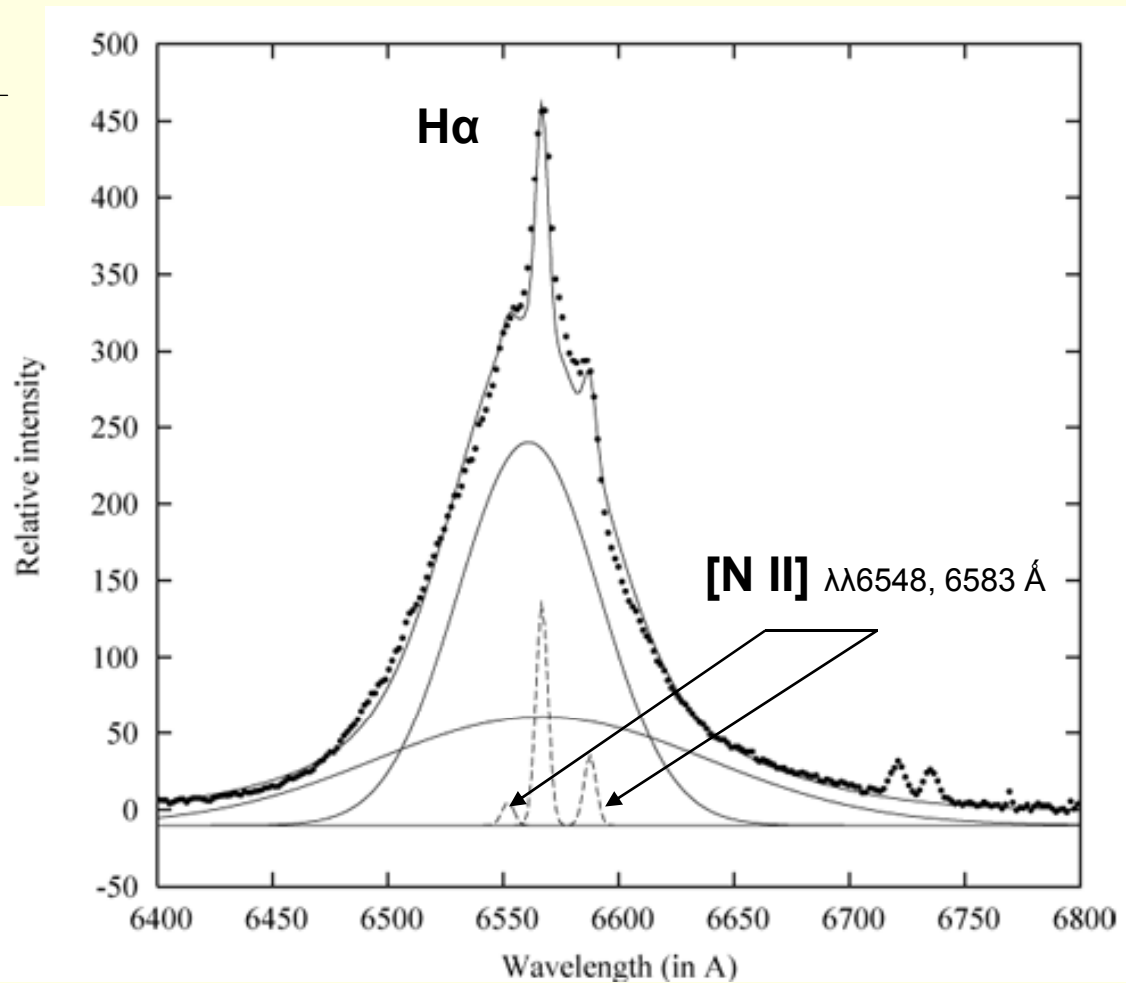
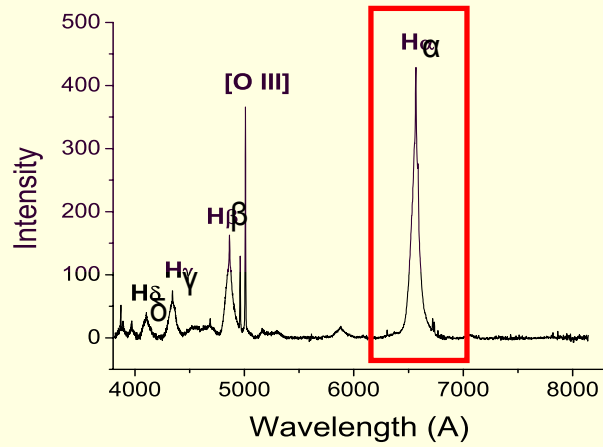
Subtracting the continuum



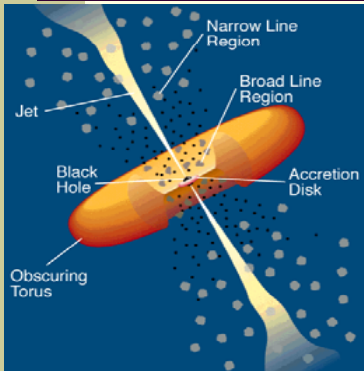
Example of fit ($\lambda\lambda 4400-5500 \text{ \AA}$)



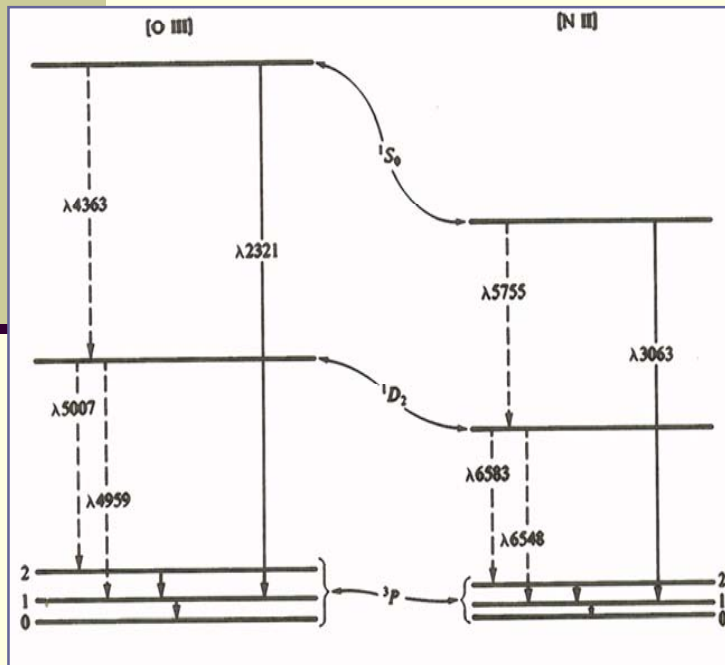
Example of fit ($\lambda\lambda 6400-6800 \text{ \AA}$)



Narrow lines: determination of physical properties of NLR (T_e and N_e)

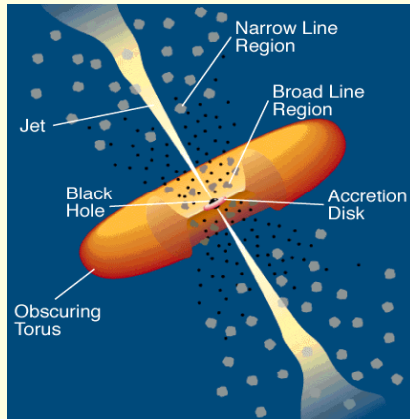


$$\frac{[\text{OIII}]_{4959} + [\text{OIII}]_{5007}}{[\text{OIII}]_{4363}} = \frac{7.73 \exp[(3.29 \cdot 10^4) / T_e]}{1 + 4.5 \cdot 10^{-4} (N_e / T_e^{1/2})}$$



$$\frac{[\text{NII}]_{6548} + [\text{NII}]_{6583}}{[\text{NII}]_{5755}} = \frac{6.91 \exp[(2.50 \cdot 10^4) / T_e]}{1 + 2.5 \cdot 10^{-3} (N_e / T_e^{1/2})}$$

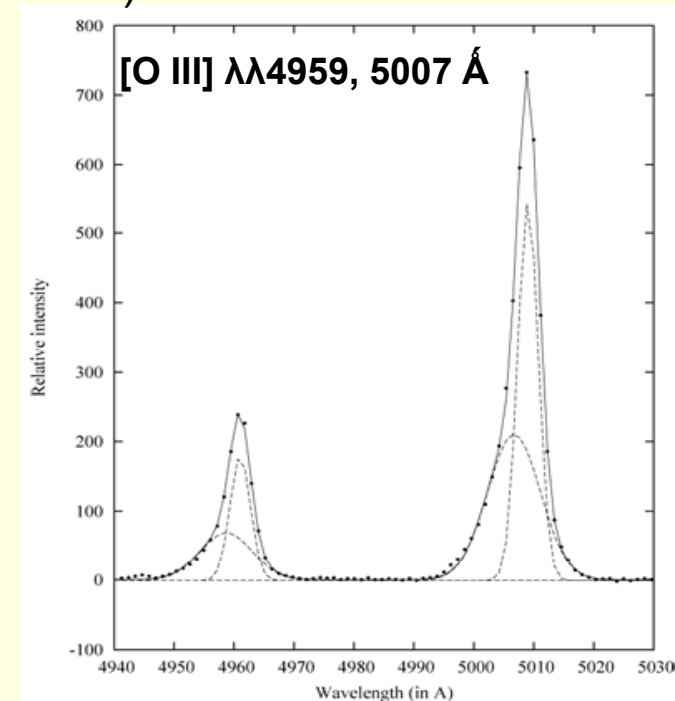
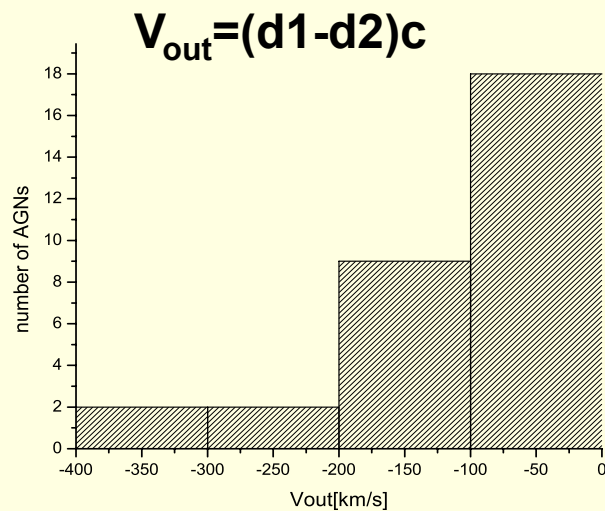
Narrow lines: analysis of kinematical properties of NLR



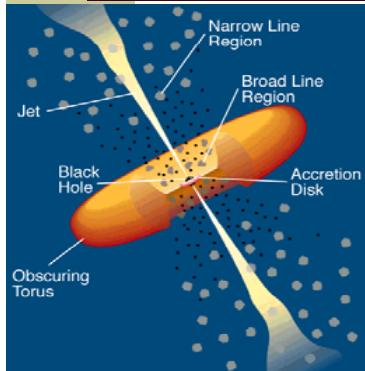
-31 AGN spectra from SDSS;

$$V_{\text{out}} = (d_1 - d_2)c$$

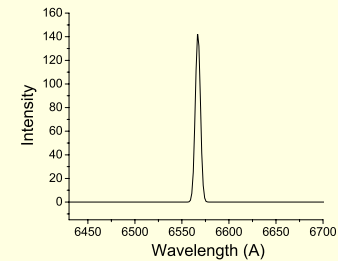
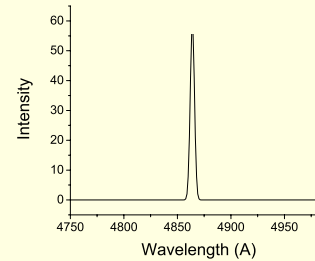
$-V_{\text{out}}$ is in the range from 0 km/s to -200 km/s.
(Kovačević et al. 2007)



Narrow lines: determination of intrinsic reddening



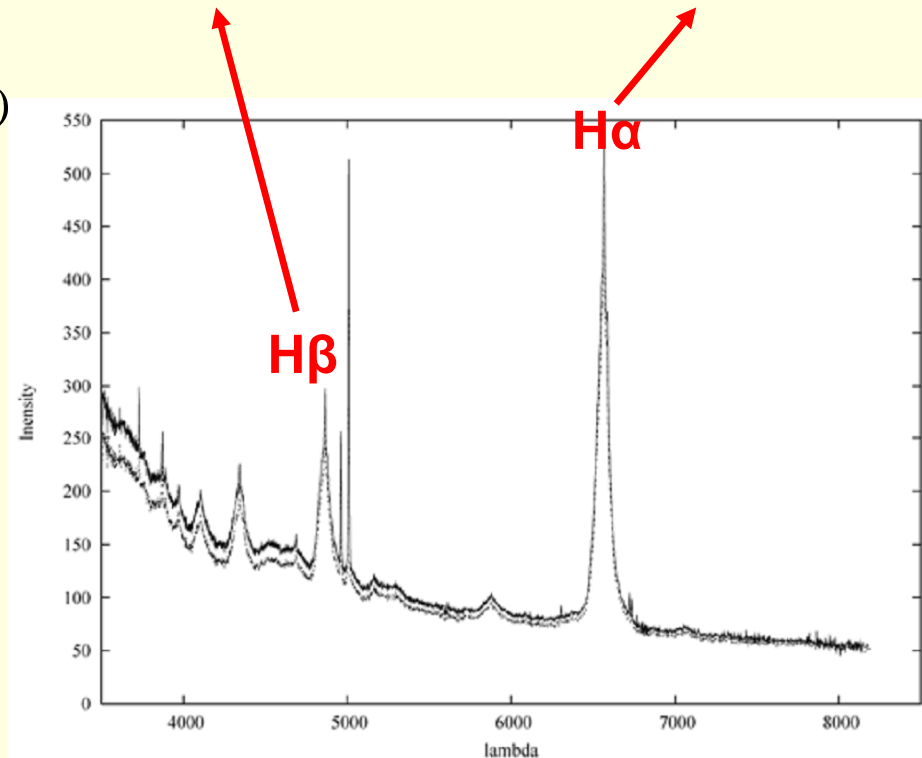
$$F_{\lambda} = F_{\lambda_0} \cdot 10^{-C f(\lambda)}$$



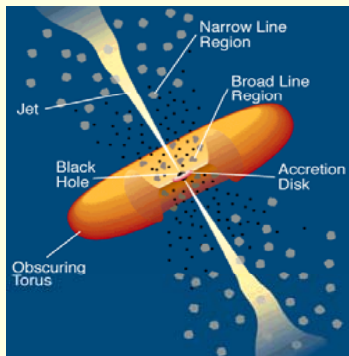
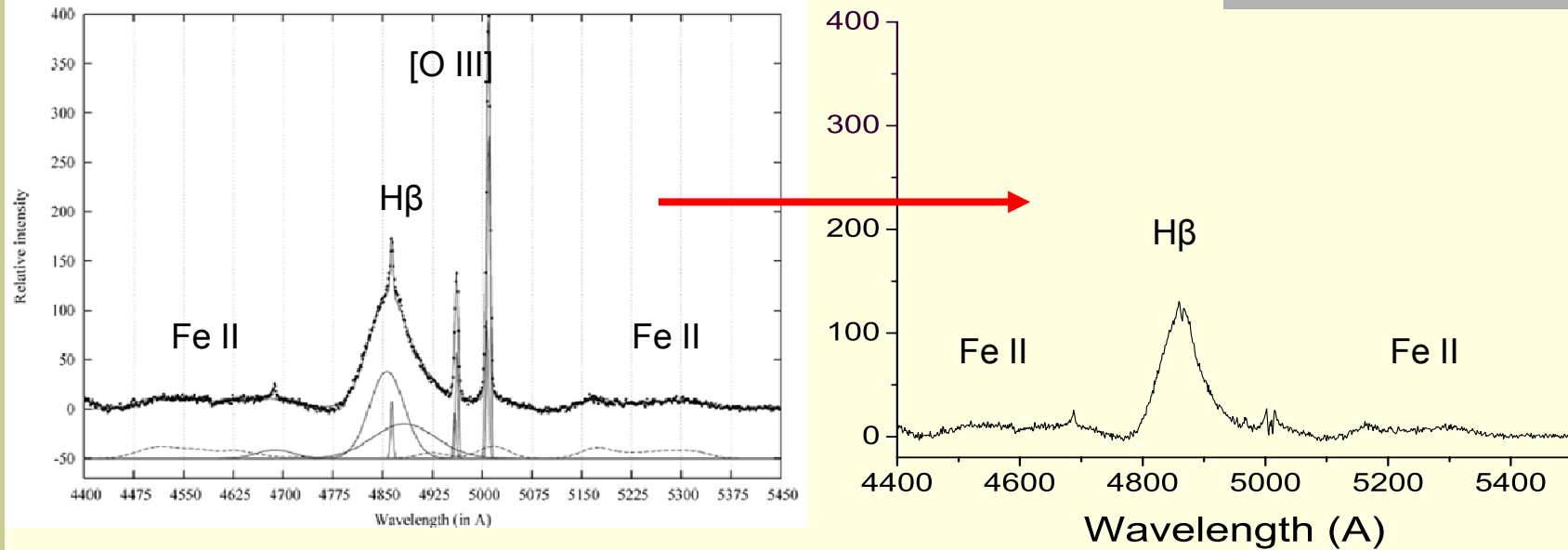
$$\log \frac{F^o(H\alpha)}{F^o(H\beta)} = \log \frac{F(H\alpha)}{F(H\beta)} + C * (f(H\alpha) - f(H\beta))$$

$$C = 3.1 * \left\{ \log \frac{F(H\alpha)}{F(H\beta)} - \log \frac{F^o(H\alpha)}{F^o(H\beta)} \right\}$$

$$\frac{F^o(H\alpha)}{F^o(H\beta)} = 3.1$$



Removing the narrow lines



- Investigation of Broad Line Region!