

# AGN feedback from QSO absorption lines

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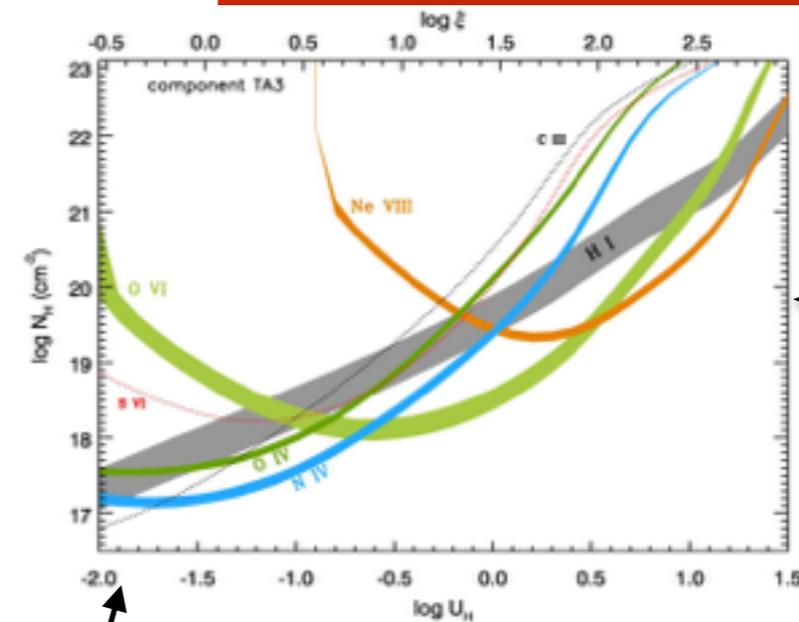
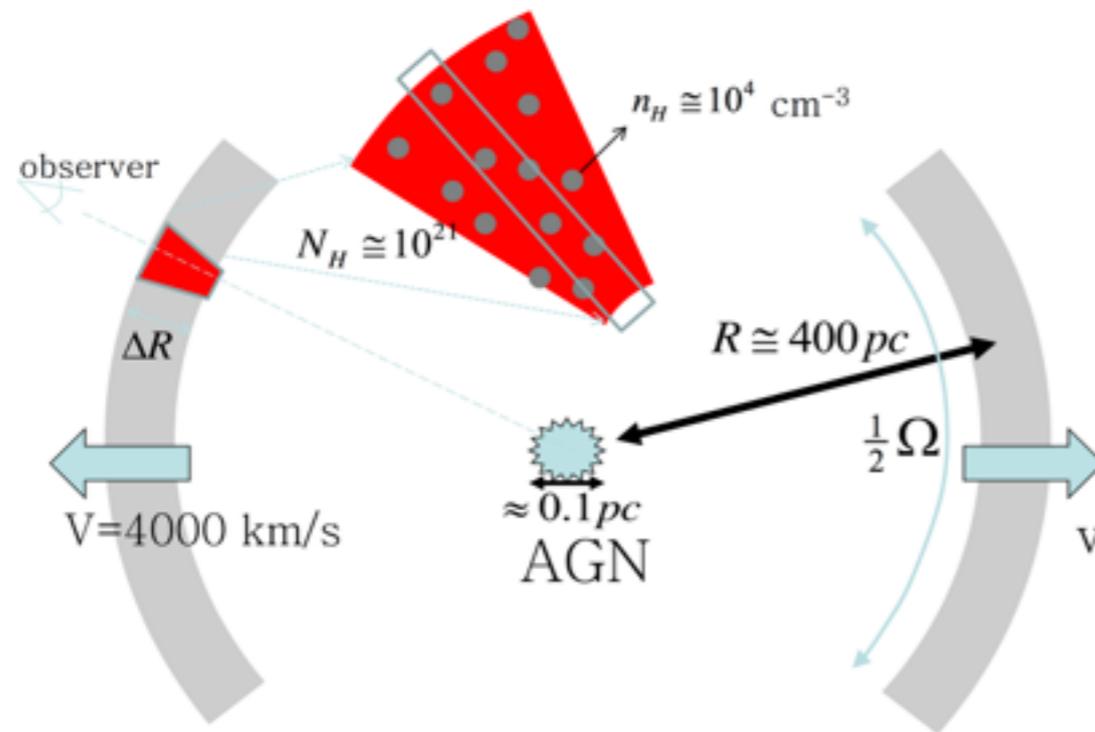


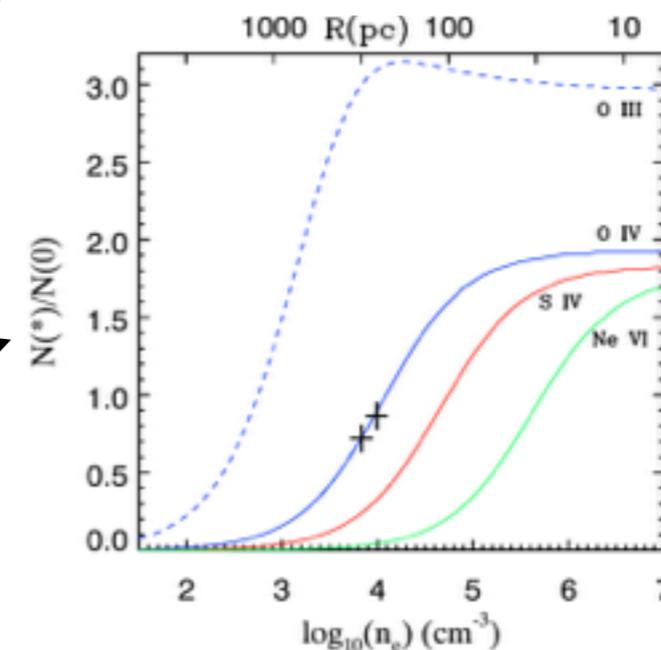
Photo ionization modeling to solve for  $N_H$  and  $U$

Kinetic Luminosity :  $\dot{E} = 4\pi\mu m_p \Omega R N_H v^3$ , **1 %  $L_{bol}$**

Mass outflow rate:  $\dot{M} = 8\pi\mu m_p \Omega R N_H v$ , **100  $M_{sun}/yr$**

- Reliable measurements of  $N_{ion}$
- Photoionization modeling to convert  $N_{ion}$  to  $N_H$  and  $U$
- Number Density via Troughs from metastable levels
- Distance of the Outflow from the Central Source:

$$U_H \equiv \frac{\Phi_H}{n_H c} = \frac{Q_H}{4\pi R^2 n_H c}$$



Fine structure lines to estimate electron density

**CLOUDY**