Some general considerations

The sizes of the HIP, MIP and LIP in units of the Schwarzchild radius $R_s = 2GM_{BH}/c^2$ are $R_{HIP} = (0.003 - 2.5) \times 10^3\ R_S$, $R_{MIP} = (0.057 - 4.8) \times 10^2\ R_S$and $R_{LIP} = (0.25 - 2.8) \times 10^4\ R_S$. Furthermore, following Krongold we estimate the line-of-sight thickness given by $\Delta R \sim N_H/n_H$, and the relative value $\Delta R/R$. Using the approximation for a fully ionized gas of solar abundance on gets $\Delta R/R = 1.23 N_H (n_e R^2)^{-1/2} (n_e)^{-1/2}$. In this case we obtain $(\Delta R/R)_{HIP} = (0.001 - 1) \times 10^{-3}$, $(\Delta R/R)_{MIP} = (0.04 - 5) \times 10^{-5}$ and $(\Delta R/R)_{LIP} = (0.2 - 2) \times 10^{-4}$. These values are in a good agreement with the results found for FeLoBALs (BAL systems with features measured in the low ionization states of iron), although in our case this corresponds to a system with a modest black hole mass $\sim 10^7$ $M_\odot$.

Implications for AGN feedback models

Here we comment on the potential implications of the values found for the warm absorber winds in driving the evolution of its host galaxy NGC3783. Our objective is not to derive a physical model for the winds, but instead discuss the values obtained in the context of recent theoretical developments on the physics of AGN feedback. We now present three relevant facts derived from our observations to present this discussion.

The first relevant fact derived from our results is that the location of the different ionization regions, R, are close to the black hole with distances less than a few thousands R_S. This is a hint that the physics of this region are dominated by winds driven by the accretion disc around the black hole [2]. The second fact is that the sizes of these regions ΔR with respect to their location is very narrow, on the order of $\Delta R/R \sim 10^{-5}$. The third important fact is that the mean values of the kinetic luminosities and the momentum fluxes computed over all the lines are on the order of $\dot{E}_k/L_{\rm bol} = (2 - 8)\%$ and $\dot{P}/(L_{\rm bol}/c) \sim 0.5 - 2$, this is presented in Figure **??**, where we have used a value of $L_{\rm bol} = 1.5 \times 10^{43}$ erg s^{-1} [3].

Recently [1] interpreted these two facts, in the context of FeloBALs, adducing a physical mechanism where the AGN blast impacts moderately dense interstellar gas clumps along the line of sight, fragmenting the clumps and sweeping them along the hot blast. From these model they predict values for the kinetic luminosities and the momentum fluxes of the order of $\dot{E}_k/L_{\rm bol} = (2 - 5)\%$ and $\dot{P}/(L_{\rm bol}/c) \sim 2 - 15$. Other models such as the cold thin shell approximation predict order of magnitude lower values for the kinetic luminosities.

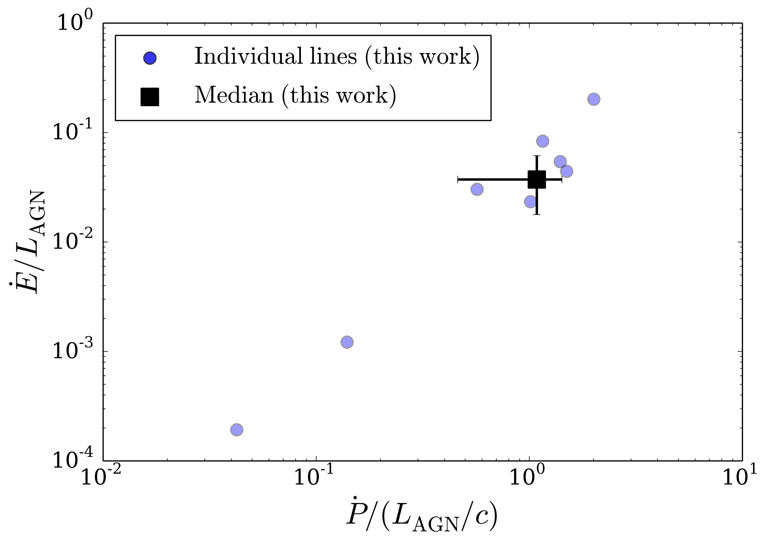

Figure 1: as

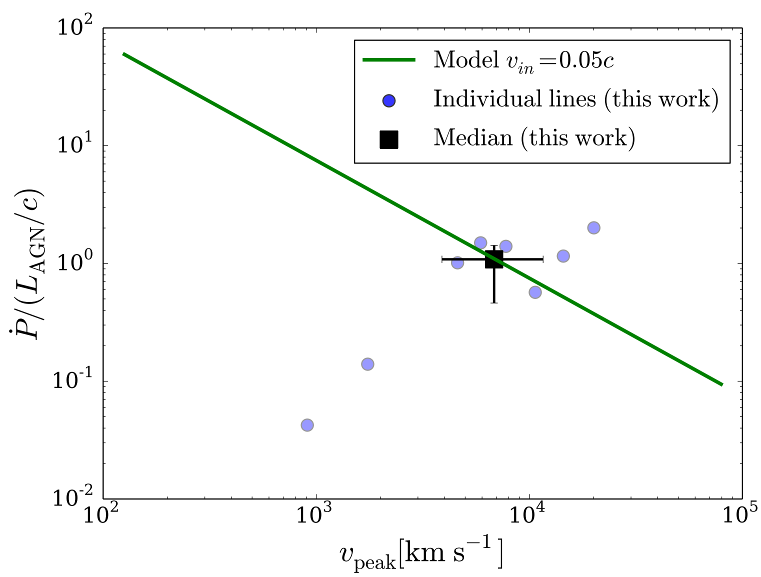

Figure 2: as

Bibliography

[1] C.-A. Faucher-Giguère, E. Quataert, and N. Murray. A physical model of FeLoBALs: implications for quasar feedback. *MNRAS*, 420:1347–1354, February 2012.

[2] N. Murray, J. Chiang, S. A. Grossman, and G. M. Voit. Accretion Disk Winds from Active Galactic Nuclei. *ApJ*, 451:498, October 1995.

[3] H. Netzer, S. Kaspi, E. Behar, W. N. Brandt, D. Chelouche, I. M. George, D. M. Crenshaw, J. R. Gabel, F. W. Hamann, S. B. Kraemer, G. A. Kriss, K. Nandra, B. M. Peterson, J. C. Shields, and T. J. Turner. The Ionized Gas and Nuclear Environment in NGC 3783. IV. Variability and Modeling of the 900 Kilosecond Chandra Spectrum. *ApJ*, 599:933–948, December 2003.