S01a QSO models based on Monte Carlo simulations

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The broad line region (BLR) is believed to surround the central engine of a QSO and exhibits a vast range of ionization and velocity ranges, which results in P–Cygni–like absorption profiles. Although these objects have been observed for several decades only simple approximations of the ionization structure and acceleration mechanism of the very inner active region have been introduced. The basic problem of past models are the assumption of spherical geometry. Although no direct information of the true geometry of the objects is known many observational hints point to a disk–like structure of the BLR, e.g. the polarization of the light of radio–quiet QSOs.

A candidate model for QSO must explain high velocity of the gas of up to 0.1 c and the observed range of ionization stages. It must also explain the fact that broad absorption lines are seen in only 10% of QSOs. I show first results of a Monte Carlo (MC) simulation of the BLR of QSOs. The advantage of this calculation method is that the path of photons is actually followed in the MC simulation so that radiation pressure of line absorption can be treated in a non–spherical geometry with a correct solution of the radiation transfer. The aim of the new code is to obtain a synthetic spectrum of the BLR and to investigate if resonance line absorption will yield the correct value of the velocity field and if it can create the deep absorption troughs for the relevant ions. With a physically motivated dynamics of the outflow, better constrains of the real geometry might be possible. Finally a more reliable abundance estimate can be made, since reabsorption of accelerated medium is taken into account rather than a statical fit of the absorbing regions.