NEW LIGHTS ON THE STRUCTURE OF THE BROAD LINE REGION WITH QUASAR MICROLENSING

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Our detailed understanding of the working engine of AGNs is still incomplete. Several basic questions remain such as: What is the geometry and kinematics of the gas flow near the black hole? How do the size of the broad line region (BLR) change as a function of the ionisation degree of the line and of the AGN's properties? Are the characteristics of the BLR changing with cosmic time? The answer to these questions is still elusive, mainly because the inner regions of the AGNs remain unresolved with current telescopes. However, nature provides us with gravitational lens telescopes which help us in our understanding of AGNs: Multiply imaged lensed AGNs, which are observed when a massive galaxy lies on our line-of-sight to a distant AGN. In those systems, the stars in the lensing galaxy magnify regions of the lensed AGN as small as a few micro-arcsecs. This scale coincides with the size of the region where most of the AGN emission comes from. In this talk, I will show that it is possible to use this so-called microlensing effect as a tool to probe the AGN structure at redshift $z > 0.5$. I will give an overview of observational evidences for microlensing-induced emission line deformations in type 1 and broad absorption line quasars. I will explain how this signal can be used to to estimate the size of the BLR. The constraints provided by the microlensing signal on the geometry of the BLR and on the geometry the outflowing absorbing material in BALs will also be discussed.