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CONSTRAINING SUB-ORBITAL STRUCTURES IN AGN ACCRETION DISKS FROM POLARIZED BROAD EMISSION LINES

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Understanding the physics of the accretion flow around black holes remains an important challenge. In the so-called thermal state the bulk of the bolometric luminosity is produced in an accretion disk. The theory of such a disk is based on the very successful, while phenomenological alpha-prescription and assumes that the disk properties do not vary with azimuth. Nonetheless, X-ray observations of a few bright Seyfert-1 galaxies suggested significant energy dissipation in very localized, active regions (hot spots). Support for such a picture also comes from (GR-)MHD modeling of the inner accretion flow. Gaskell (2010) suggested that off-axis dissipation of energy is important also at larger disk radii where the optical/UV continuum is produced. I present radiative transfer modeling for various off-axis irradiation scenarios and show that they explain characteristic variations of the polarization degree and position angle across broad emission lines. Implications of the model for the broadband spectrum are discussed and compared to spectropolarimetric observations of several Seyfert galaxies. I illustrate how polarization variability can discriminate the off-axis model from previous interpretations that are based on axis-symmetric scattering. A main goal of this work is to constrain the fraction of the accretion energy that is transformed into continuum radiation by an off-axis source and to thus provide new observational constraints for accretion models.

COST ACTION MP1104 "POLARIZATION AS A TOOL TO STUDY THE SOLAR SYSTEM AND BEYOND"

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