XV Serbian Conference on Spectral Line Shapes in Astrophysics, June 9 - 13, 2025, Niš, Serbia
Book of Abstracts, Eds. P. Marziani, M. S. Dimitrijević, L. Č. Popović and Đ. Savić
Astronomical Observatory Belgrade, Special Issues No. 2
https://doi.org/10.69646/15scslsa23

PROBING KEPLERIAN ROTATION IN QUASARS USING MICROLENSING-INDUCED LINE PROFILE DISTORTIONS

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Direct observational evidence regarding the kinematics within the regions emitting the characteristic broad emission lines (BELs) in active galactic nuclei and quasars remains scarce. Gravitational microlensing, induced by compact stellar-mass objects in lens galaxies, introduces distortions in quasar BEL profiles, providing a unique opportunity to probe the innermost regions of distant quasars. Here, I present a novel method for deriving rotation curves at light-day spatial scales in gravitationally lensed quasars by analyzing microlensing-induced changes in the wings of high-ionization ultraviolet emission lines. Employing Bayesian techniques, I measure the sizes of the emission regions and test whether the observed velocity-dependent microlensing effects are consistent with a Keplerian disk model. The results reveal a smooth, monotonic increase in magnification with velocity, strongly supporting the Keplerian rotation of an inclined disk. This study provides the first direct observational evidence of Keplerian rotation within quasar inner regions, covering radial distances from approximately 0.5 to 20 light-days.