

SDSS J1334+3315: A Resolved Lensed Quasar with Separation 0".8

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We have observed the newly discovered SDSS Quasar Lens Search (SQLS) [1,2,3,4,5,6] gravitationally lensed quasar candidate pair SDSS J1334+3315 in the J , H and K' bands, using the Subaru Telescope adaptive optics system with laser guide star (LGSAO188) [7,8]. The quasar pair has a redshift of $z = 2.426$, and a separation of $0''.833$. We were successful in achieving a clear detection of the lensing galaxy located in between the two quasars, thus proving that this is one gravitationally lensed quasar. In Figure 1, we show the improvement obtained in resolution due to the use of AO. We estimate the redshift of the lensing galaxy to be 0.557 based on absorption lines in the quasar spectra as well as the color of the galaxy. Our gravitational lens mass modeling with improved astrometry implies that a nearby bright galaxy $\sim 4''$ apart from the lensing galaxy is likely to affect the lens potential (Figure 2). The bright nearby galaxy is clearly revealed to be a spiral in the LGSAO188 observations.

This is the first in a campaign of Subaru Telescope adaptive optics observations of the SQLS lensed quasars, and demonstrates the usefulness of the LGSAO188 imaging for studying small-separation strong lens systems.

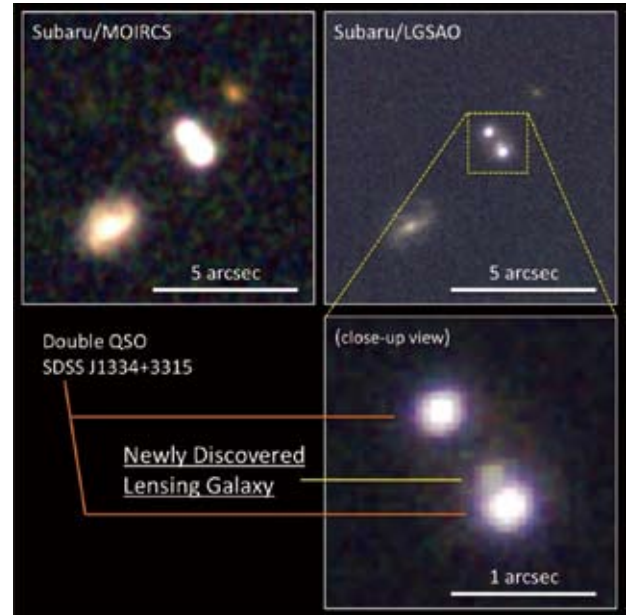


Figure 1: J , H , K' band SDSS J1334+3315 imaged without (upper left) and with adaptive optics (upper right). The lower panel, enlarged five times, shows for the first time the resolved lensing galaxy located in between the two quasar images.

References

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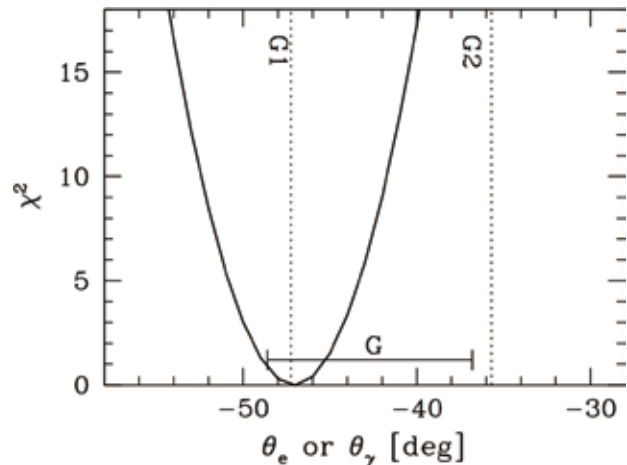


Figure 2: Best-fit χ^2 for the mass model, as a function of the position angle of the singular isothermal sphere (SIS+ γ) model (or alternatively, singular isothermal ellipsoid). The horizontal line indicates the 1σ range of the measured position angle of the lensing galaxy G. The vertical dotted lines show directions of the external shear corresponding to the location of nearby galaxies G1 (the bright spiral) and G2, strongly suggesting the influence of G1.