

X50a Revealing the nature of Quadruply Lensed Quasar System (J0147+4630)

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We present the results of a spectroscopic investigation of the quadruply lensed quasar system J0147+4630, with the primary objective of determining the redshift of its lensing galaxy and addressing prior discrepancies in the system's characterization. Previously, the lens redshift was determined to be 0.577 (Rubin et al 2018) and 0.678 (Goicoechea and Shalyapin 2019 ; Mozumdar et al 2023). We determined the lens redshift using long-slit spectral data obtained with the Faint Object Camera and Spectrograph (FOCAS) on the Subaru Telescope. We have carefully extracted the spectrum of the lensing source, removing contamination from the background bright quasar. Based on the extracted spectrum which exhibits absorption lines arising from the stellar component, we carried out full spectral fitting analysis using a library of stellar spectral templates. The updated lens redshift was integrated into a gravitational lens model of the system, revealing key details about the mass distribution of the lensing system. Notably, the system's unique asymmetric configuration, resembling a "parachute," offers new insights about the complex interplay of the lensing system. These results contribute to improving lensing models and understanding the environment of the lensing system.