

The H0 bias due to angular structures in lenses

Time-delay cosmography studies generally assume axi-symmetry of the deflector. However, nearby elliptical galaxies show deviation from ellipticity that can be captured by expanding the elliptical isophotes into higher order Fourier modes. Multipoles of order 4, corresponding to disky or boxy shapes, are the most commonly observed perturbations. We have studied how such azimuthal structures manifest in extended lensed images, and if ignoring them yields any bias on H0 in time delay cosmography studies. Specifically, we have mocked images of a QSO+host source lensed by an elliptical mass distribution perturbed by multipolar components. We assess the detectability of those multipoles by modeling the lensed images without angular structure, using state-of-the-art lens modeling technique. When the S/N of the data is too low, the imprints of those multipoles on the lensed images are hidden in the noise, and the value of H0 inferred from the model is biased by up to several percent. Finally, we discuss the impact of angular structure on H0 inference for the TDCOSMO/H0LICOW sample.

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