

Imperfect models and constraints: stellar kinematic constraints fail to correctly break the mass sheet degeneracy at the 1% level

Because of the mass sheet degeneracy (MSD), lensing information alone is incomplete to constrain H_0 . To break the degeneracy, assumptions are made through the modeling process about the mass profile of a galaxy e.g. it follows a power law. If the actual galaxy does not perfectly match the model profile, the recovered value of H_0 can be biased. Common practice is to improve the fit using constraints from stellar kinematic information, but this practice also must include assumptions about a profile shape which may be imperfect. I present results from a test study where synthetic lenses are created and fit with a power-law model which does not perfectly match the true profile. Through placing constraints on the fitting process analogous to stellar kinematic constraints, I find that the velocity dispersion constraint can actually introduce more bias than its omission if the kinematic model is misinformed. This surprising result may indicate that the constraints from stellar kinematics could be biasing the lensing determinations of H_0 . This concerning finding merits further investigation.

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