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A New Non-parametric Method for Reconstructing the Kinematics of Lensed Galaxies[1] ANTHONY YOUNG, CHARLES KEETON, ANDREW BAKER, Rutgers University — Studying the evolution of galaxies in the high-redshift universe can prove difficult because of their low fluxes and small sizes. The bending of light rays by gravitational lenses magnifies the images of these objects, allowing us to study them in more detail. However, studying lensed sources requires careful modeling of both the lensing mass distribution and the extended source emission. This modeling becomes even more challenging when working with integral field spectroscopy, which measures the spatial distribution of emission within a series of narrow velocity channels. The additional velocity information allows us to derive kinematic and other galaxy properties that aid in understanding the processes that drive the evolution of galaxies at high redshifts. We will present an improved non-parametric modeling strategy that better reconstructs the full 3D intensity distribution without placing strong priors on the kinematics or morphology of the source. This approach uses a new physically motivated regularization scheme that is better suited to the 3D nature of the data than previous approaches that model emission at different velocities independently. We will then compare the different approaches for reconstructing sources using mock observations of dusty star-forming galaxies.

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