A model-independent approach to gravitational lensing

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Strong gravitational lenses can map an extended background source to several highly distorted and magnified images. Analysing the properties of those images yields important information about the distribution of the lensing mass and the background source. Common approaches to reconstruct the source or the lensing mass distribution model the *global* properties of the source and the lens. They obtain a consistent description of the entire configuration by refining the model until it matches the observation to a predefined precision.

We develop a new approach to infer *local* properties of the gravitational lens and to reconstruct the source using only the properties of the multiple images without assuming a lens or a source model. In the talk, I will introduce the method and its calibration by simulated lensing configurations, show its application to the galaxy-cluster-scale gravitational lens CL0024, and compare the resulting local lens properties to those obtained by two different lens modelling methods.

As our approach relies on fewer assumptions and takes less than a second to yield results that agree to the model-based ones, it is an efficient tool for extracting local lensing properties from large data sets of forthcoming sky surveys.

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