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Studying dark matter substructure with gravitational lensing SEAN BRENNAN, CHARLES KEETON, Rutgers Univ — The Cold Dark Matter (CDM) paradigm does a remarkably good job of reproducing the large scale structure of the universe, but it predicts more small-scale structure than seems to be observed. In particular, CDM predicts that a galaxy like the Milky Way should have thousands of dark matter "subhalos", but only a few dozen dwarf galaxies are observed. Gravitational lensing provides an opportunity to search for dark matter subhalos, because they affect the distortions that occur when the gravity of a foreground galaxy bends light from a background source. Some gravitational lens systems exhibit features that cannot be explained by a smooth mass distribution, but are well fit by a model that includes a mass clump representing a dark matter subhalo. Some groups use these single-clump models to claim the detection of individual dark matter subhalos, measure their properties, and then constrain the abundance of dark matter substructure. In our work, we consider whether it is valid to use single-clump lens models to draw conclusions about CDM. We create realistic mock lenses with populations of dark matter subhalos, fit them with single-clump models, and assess whether the models yield reliable measurements of the subhalo properties.

Sean Brennan
Rutgers Univ

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