

Line-of-sight Lensing -a New Window to Dark Matter and Distant Dwarf Galaxies

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Matter fluctuations on scales of <10 kpc are important for understanding the nature of dark matter and dwarf galaxies residing at cosmological scales. Gravitational lensing is a powerful tool for directly probing the nature. However, the lensing signal is too small for current and near future observations. To circumvent the problem, I propose to use massive galaxy-scale strong lensing systems to amplify the weak lensing effects due to dwarf galaxy-scale halos and troughs(voids) in the line of sight. Recent studies suggest that the major cause of anomaly in flux ratios in quasar-galaxy quadruple lens systems is line-of-sight structures rather than subhalos in the primary lensing halos. Moreover, the observed anomaly is turned out to be consistent with perturbations due to line-of-sight structures in cold dark matter models. In this talk, I will review the recent studies of theoretical and observational line-of-sight lensing, present on-going projects and discuss future prospects.

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