

Probing ultra-small scale cosmological structures with diffractive lensing of GW

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Gravitational waves (GW) radiated by compact binary coalescences can be diffracted by astrophysical-size objects due to long wavelengths. This is so-called diffractive lensing. The length scale of the diffraction is determined by the geometric mean of GW wavelength and the effective distance to the lens, and it becomes $O(1 \text{ pc})$ assuming GW frequency $\sim 1\text{Hz}$ and the distance to lens $\sim 1 \text{ Gpc}$. Therefore, diffractive lensing phenomena can be used to probe cosmological structures around parsec length scales assuming proper GW sources and detectors. With this idea, I'll explore the prospect of probing very light dark matter (sub-) halo. Furthermore, I will discuss how we can constrain the sub-parsec matter power spectrum even when we can not detect a single diffractive lensing event.

Secondary category for the parallel session (optional)

Gravitational Waves

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