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How to model the effect of small-scale structures on light propagation?

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In standard cosmology, observations are interpreted as if light propagated through a universe whose inhomogeneities are modeled by perturbations with respect to the FLRW spacetime. However, the very narrow light beams associated with point-like sources—such as supernovae—probe the Universe at extremely small scales (˜AU), up to which the perturbative approach should break down. In this talk, I will present an alternative framework where the lensing due to small-scale structures is treated as a diffusion process.

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