Paris workshop on Bayesian Deep Learning for Cosmology and Time Domain Astrophysics 3rd ed.



ID de Contribution: 33

Type: Talk

The plug-and-play approach: learning the prior distribution from simulations. Application to gravitational wave reconstruction

mercredi 21 mai 2025 12:10 (20 minutes)

Current efforts in the LIGO-Virgo-KAGRA (LVK) collaboration focus on either parameter estimation from the observations of all available detectors, or denoising the measurements from a single detector. In this work, we address an intermediate task: reconstructing the original gravitational wave (GW) from the measurements of all available detectors. This inverse problem is ill-posed, and thus requires the choice of a prior distribution that has a critical impact on the reconstruction quality. In this presentation, we will describe how we adapted the plug-and-play approach (that learns a general prior from a dataset using deep learning, and currently produces state-of-the-art results on natural image processing) to the reconstruction of GWs. We will also show an application to a synthetic signal, and detail the key geometric features the learned prior preserves.

Authors: CHASSANDE-MOTTIN, Eric (CNRS AstroParticule et Cosmologie); PALUD, Pierre (APC)
Orateur: PALUD, Pierre (APC)
Classification de Session: Gravitational waves