Contribution ID: **12** Type: **Parallel talk**

Simulation-Based Inference of the Double White Dwarf Population in Gravitational Wave Data

Understanding the population properties of double white dwarfs (DWDs) in the Milky Way is a key science goal for the upcoming gravitational wave detector, LISA. However, the vast number of galactic binaries (~30×10^6) and the large data size (~6×10^6) pose significant challenges for traditional Bayesian samplers. In this talk, I present a simulation-based inference framework to infer the population characteristics of these binaries directly from LISA data. Our approach leverages a GPU-accelerated forward simulator, enabling the efficient generation of synthetic populations under various astrophysical models. We design a robust summary statistic to compress the high-dimensional input data while preserving the essential population information. We demonstrate the potential for scalable and accurate population inference for deeper insights into the evolution and distribution of galactic white dwarfs.

AI keywords

Simulation-Based Inference; Bayesian Inference; Data-Summaries; Parameter Estimation

Primary author: SRINIVASAN, Rahul (Istituto Nazionale di Fisica Nucleare)

Co-authors: Dr PITTE, Chantal (SISSA, Italy); BARAUSSE, Enrico; Prof. TROTTA, Roberto (SISSA, Italy)

Presenter: SRINIVASAN, Rahul (Istituto Nazionale di Fisica Nucleare)

Track Classification: Simulations & Generative Models