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Stochastic Gravitational Wave Background Analysis with SBI

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In some sense, the detection of a stochastic gravitational wave background (SGWB) is one of the most subtle GW analysis challenges facing the community in the next-generation detector era. For example, at an experiment such as LISA, to extract the SGWB contributions, we must simultaneously: detect and analyse thousands of highly overlapping sources including massive binary black holes mergers and galactic binaries; constrain and characterise the instrumental noise (which will not be known fully pre-flight and may be non-stationary); and finally separate the SGWB components that might be astrophysical or cosmological in origin. In this talk, I will discuss the application of simulation-based inference techniques, implemented in the code saqqara, to this analysis problem, focussing on the ability of SBI to strike a balance between the potentially conflicting goals of precision, scalability, and computational cost.

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