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# Multifidelity Approach to Simulation-Based Inference in Gravitational-Wave Data Analysis

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Simulation-based inference (SBI) is opening new possibilities in gravitational-wave data analysis, including the use of computationally expensive simulators to generate waveforms. When simulators are computationally expensive, generating sufficient training data becomes challenging. Multifidelity methods combine the accuracy of high-fidelity (expensive and accurate) models with the computational efficiency of low-fidelity (fast and less accurate) models. This transfer learning approach makes inference tractable even with limited simulation budgets, potentially enabling analyses that would otherwise require prohibitive computational resources.

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