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Stein Variational Inference for Gravitational Wave Likelihood Estimation ALEX LEVIYEV, BASSEL SALEH, JOSHUA CHEN, PENG CHEN, OMAR GHATTAS, AARON ZIMMERMAN, University of Texas at Austin, UT GRAVITATION GROUP TEAM, ODEN INSTITUTE TEAM — The planned upgrades to the gravitational wave detectors promises a vastly improved detection rate for binary inspirals; however, a full parameter estimation analysis of such a signal can take days or weeks. This presents a bottleneck in the performance of a gravitational wave analysis pipeline. Improvements in the speed and efficiency of parameter estimation would have many potential benefits, e.g. facilitating the use of more sophisticated—and computationally expensive—signal models. Current parameter estimation techniques (such as nested sampling) rely on stochastic sampling algorithms. We propose a new optimization based algorithm which relies on minimizing the Kullback—Leibler divergence between an approximation of, and a reference posterior. This procedure yields a transport map that can be used to produce an arbitrary sized empirical sampling. We test whether this indeed can lead to a faster, yet still accurate alternative.

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