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Simulation-based inference for compact binaries STEPHEN GREEN, JONATHAN GAIR, Albert Einstein Institute Potsdam — Over the past five years, LIGO and Virgo have published 50 detections of gravitational waves from compact binary coalescences. To infer the system parameters, iterative sampling algorithms such as MCMC are typically used with Bayes' theorem to obtain posterior samples—by repeatedly generating waveforms and comparing to measured strain data. In this talk, I will describe instead the use of simulation-based inference with deep neural networks to learn non-iterative surrogate models for the posterior, which can be used to perform accurate inference in seconds. We use normalizing flows to represent the full 15-dimensional posterior distribution for binary black holes, and we demonstrate inference on real data. These approaches therefore represent a path forward for fast multimessenger alerts and a means to address the growing rate of detections. I will conclude by discussing prospects for treating non-Gaussian detector noise using these methods.

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