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Parameter Estimation using Neural Networks in the Presence of Detector Effects ADI SURESH, Department of Physics, University of California, Berkeley, CA 94720, USA, ANDERS ANDREASSEN, Google, Mountain View, CA 94043, USA, SHIH-CHIEH HSU, Department of Physics, University of Washington, Seattle, Washington 98195, USA, BENJAMIN NACHMAN, Physics Division, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA, NATCHANON SUAYSOM, Department of Physics, University of Washington, Seattle, Washington 98195, USA — Histogram-based template fits are a common technique for parameter estimation in high energy physics and other areas of physics where Monte Carlo event generators are reliable. Parameterized neural network reweighting can be used to extend this fitting procedure to many dimensions and does not require binning. If the fit is to be performed using reconstructed data, then expensive detector simulations must be used for training the neural networks. We introduce a new two-level fitting approach that only requires one dataset with detector simulation and then a set of additional generation-level datasets without detector effects included. This Simulation-level fit based on Reweighting Generator-level events with Neural networks (SRGN) is demonstrated using simulated datasets for a variety of examples including a simple Gaussian random variable, strong force radiation modeling (parton shower tuning), and the top quark mass extraction. This presentation is based on https://arxiv.org/abs/2010.03569.

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