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**Deep Learning the Jet Response** ROHAN BHANDARI, Univ of California - Santa Barbara , RAGHAV ELAYAVALLI, Wayne State University, ALEXX PERLOFF, University of Colorado Boulder, ANDREW WHITBECK, Fermi National Accelerator Lab — Understanding and correcting the detector response to any observable of interest is an important task for experimentalists and is necessary for removing the impact of detector imperfections and facilitating direct comparisons with theoretical predictions. Determining the detector response to jets, however, is particularly difficult as jets are composed of many correlated particles of various types that are incident on a large area of a detector. To cope, current methods ignore the extra information of the jets internal structure contained by these particles and simply parameterize the response as a function of the jets transverse momenta and rapidity. The rise of Deep Learning, however, provides a framework in which to understand these correlations and extract robust measurements of the jet response. By representing jets as images, a deep convolutional neural network can be trained on lower-level features of the jet structure. These jet images allow the network to learn the jet response as a function of observables such as the jet fragmentation and energy distribution. We show that with jet images one can effectively reproduce the results of existing methods, while additionally exploiting the jets internal structure, leading to improved measurements of the jet response.

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