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Reconstructing silicon pixel hits using Neural Networks SANJANA SEKHAR, Johns Hopkins University, CMS COLLABORATION COLLABORATION — Future operation of the Large Hadron Collider will record a higher number of proton-proton collisions and will thereby yield larger data rates and sample sizes. This will stress real-time triggering systems and offline event reconstruction. Heterogenous computing systems utilizing both CPU and GPU hardware are being developed to deal with these tasks. The precise reconstruction of silicon pixel hits is an important aspect of tracking, however current reconstruction algorithms are not optimal for a GPU implementation. In recent years, fast implementations of neural networks have been built on GPU hardware for deep learning. We therefore investigate the use of hybrid convolutional neural networks and deep neural networks in hit reconstruction. We train and test the networks on data from a detailed silicon sensor simulation, Pixelav, tuned to simulate heavily radiation-damaged detectors. We find that the resulting reconstruction algorithm equals, and in certain cases outperforms present reconstruction algorithms in the predicted resolutions.

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