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**Applying Recurrent Neural Networks to IceCube event reconstructions** JOHANNES WAGNER, Drexel Univ, ICECUBE COLLABORATION — The IceCube Neutrino Observatory is a neutrino detector located in the deep glacial ice near the south pole. It is made up of a three-dimensional array of photodetectors contained within a cubic kilometer of ice. These measure the Cherenkov light from secondary particles caused by neutrino interactions. IceCube is primarily concerned with searching for neutrinos from astrophysical and atmospheric sources, making it a powerful tool to study the properties of these elusive particles. As a neutrino experiment, it relies on accurate predictions of particle energies and trajectories. Traditionally, reconstructions are done using likelihood maximization techniques. Recurrent Neural Networks (RNN's) present an interesting opportunity to improve both the speed and resolution of these reconstructions. These networks try to predict desired parameters from given time-series data by minimizing the error between known true values and predicted values. This is a natural fit for IceCube particle data, which consists of a time-series of detector hits. Using an RNN implementation combined with gaussian variance estimation, we can predict both the desired quantities as well as their uncertainties. The most recent results show promise for this new method of IceCube reconstructions.

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