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Using Neural Networks to Reconstruct GeV-Scale Neutrino Events in IceCube[1] JESSIE MICALLEF, Michigan State Univ, ICECUBE COLLABORATION — The IceCube Neutrino Observatory is the world's largest neutrino telescope, located under the ice in the South Pole. It aims to detect astrophysical and atmospheric neutrinos to discover cosmic sources of neutrinos and to better constrain fundamental neutrino parameters, such as the mixing parameters controlling neutrino flavor oscillations. IceCube's 3D hexagonal array of 5160 digital optical modules (DOMs) detects light from neutrino interactions in the ice and can be used to reconstruct the incident neutrino's energy, direction, etc. A convolutional neural network, typically used for image identification, can be adapted to IceCube's DOM array to reconstruct properties of the incident neutrino. Neural networks have been successfully used in IceCube for reconstruction at higher energies (100 GeV - 10 PeV), but understanding fundamental neutrino parameters requires exploring neutrino events at lower energies (less than 100 GeV). These events leave sparse signals in IceCube, so the network requires reoptimization. In this talk, I will present my work applying a convolutional neural network to reconstruct the energy and direction of low energy neutrino events in the IceCube detector.

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