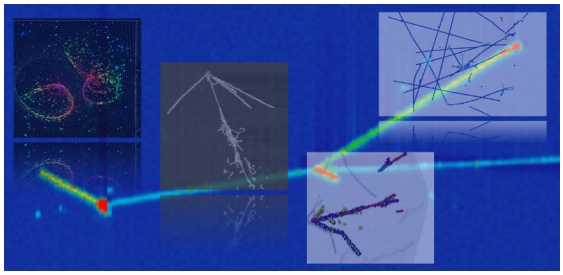

Contribution ID: **28** Type: **Collaboration Talk**

Reconstructing Inelasticity in IceCube using Deep Neural Networks

Tuesday, 22 August 2023 10:00 (35 minutes)

The IceCube neutrino observatory is a gigaton-scale water Cherenkov detector located at the South Pole instrumented with 5160 optical modules in a cubic kilometer of ice. When a high energy neutrino undergoes deep inelastic scattering, the inelasticity of the interaction is the fraction of energy deposited in the hadronic shower to the incoming neutrino energy. For a muon neutrino event, where the interaction vertex is contained within the instrumented detector volume, it is possible to measure the energy of the shower as well as the energy of the outgoing muon–which sum to the energy of the incoming neutrino. We show that by using deep neural networks trained on PMT pulse information from IceCube's optical modules, we can reconstruct the components of the event's energy partitioned into the hadronic shower and outgoing muon and extract the inelasticity of the interaction.

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