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A model independent framework for measuring the neutrino-nucleon cross section at UHE neutrino detectors

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At the highest energies, the neutrino nucleon cross-section σ can only be measured via interaction of ultrahigh energy (UHE) neutrinos with target particles in the Earth. The energies involved ($E_\nu \geq 10^{16}$ eV) probe \sqrt{s} higher than anything possible at current colliders. Measurement of σ at these energies will directly probe new physics models. Many current and future detectors are planned to detect these UHE neutrinos. In this talk we present a model independent framework for evaluating how well these many different instruments can measure σ for any arbitrary neutrino flux, what the required detector resolutions are, and what statistics will be needed. We find that with modest numbers of neutrinos and achievable energy and angular resolutions, measurement of σ is possible in the near future with the broad spectrum of upcoming UHE neutrino detectors.

Collaboration name

Author: Dr PROHIRA, steven (The Ohio State University)

Co-authors: ESTEBAN, Ivan (CCAPP, Ohio State University); BEACOM, John (Ohio State University)

Presenter: Dr PROHIRA, steven (The Ohio State University)

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