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Measurement of kaon-carbon forward scattering with EMPHATIC spectrometer

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The precision measurements of neutrino oscillation parameters and neutrino-nucleus scattering and also unprecedented sensitivity to physics beyond the Standard Model are the goals of the next generation of long-baseline neutrino experiments. To achieve this high precision and sensitivity, these experiments need a reduction of the uncertainties in neutrino flux calculations. New measurements of hadron-nucleus interaction cross sections are needed to reduce uncertainties of neutrino fluxes. EMPHATIC (Experiment to Measure the Production of Hadrons At a Testbeam In Chicagoland) is a low-cost, table-top-sized, hadron-production experiment located at the Fermilab Test Beam Facility (FTBF) that aims to measure hadron scattering and production cross sections that are relevant for neutrino flux predictions. In my presentation, I will show measurements of the differential cross-section as a function of scattering angle for kaon-carbon interactions with a single charged particle in the final state at beam momenta of 30 GeV/c. These results can be used in current and future long-baseline neutrino experiments, and demonstrate the feasibility of future measurements by the EMPHATIC spectrometer.

Supervisor

Nikolay Kolev

Funding Agency

NSERC

Supervisor Email

Nikolay.Kolev@uregina.ca

Your Email

b.ferrazzi@gmail.com

Primary author: Mr FERRAZZI, Bruno (University of Regina)

Presenter: Mr FERRAZZI, Bruno (University of Regina)

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