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Hadron Production Measurements for Neutrino Experiments

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In current measurements of accelerator-based neutrino experiments, neutrino flux uncertainties represent a leading systematic uncertainty. Neutrino beams are created from the decays of secondary hadrons produced in hadron-nucleus interactions. Primary and secondary hadron production processes for neutrino beams are the leading source of flux uncertainty. Therefore, precise hadron production measurements are essential.

The neutrino program of the NA61/SHINE experiment at CERN's Super Proton Synchrotron makes measurements of hadron production. This talk will first present recent hadron production measurements for precise neutrino flux predictions needed by T2K and Fermilab long-baseline neutrino experiments. The talk will then review the performance of the latest collected data utilizing a 90-cm-long T2K replica graphite target with the upgraded NA61/SHINE facility. Lastly, the talk will discuss the prospects for near future hadron production measurements in NA61/SHINE, including the possibility to extend the physics program to lower beamline energies.

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