

Measurement of analyzing powers for neutrons scattering on CH₂, CH, C and Cu targets at the momenta from 3.0 to 4.2 GeV/c

Thursday, 13 September 2018 15:10 (20 minutes)

Analyzing powers for polarized neutrons have been measured only for thin hydrogen targets. Cross sections and analyzing powers for np, for both elastic scattering and charge exchange are known up to 29 GeV/c. No data exist for thick analyzers.

During two beam runs in the years 2016 and 2017, the analyzing powers for protons and neutrons scattering on CH₂, CH, C and Cu targets were measured at the nucleon momentum from 3.0 to 4.2 GeV/c with the ALPOM2 setup at the Nuclotron accelerator. The data for polarized neutron beam are obtained for the first time, thanks to the unique polarized deuteron beam that is presently available up to 13 GeV/c.

The measurement of the angular dependence of A_y for the neutron is essential to the continuation of the neutron form factor measurements to the highest possible transferred momentum- Q^2 at the Jefferson Laboratory. The reaction $p+\text{Cu}(W)$, with the detection of a neutron in the forward direction by a hadron calorimeter, can be used for the measurement of the proton polarization at the future NICA collider.

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Session Classification: Acceleration, Storage and Polarimetry of Polarized Beams

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