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Measuring the Polarizabilities of Neutral and Charged Pions at JLab

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The electric and magnetic polarizabilities of a particle describe its response to external electric and magnetic fields. The values of electric (alpha) and magnetic (beta) polarizabilities depend on the “stiffness” of the particle’s constituent bonds and provide important information about its internal structure. As the lightest bound state of QCD, the pion’s polarizability is measured to test Chiral Perturbation Theory (ChPT) at low energies.

The polarizabilities of charged and neutral pions will be extracted from experimental data obtained at Jefferson Lab. This involves measuring the cross-section of pion pair production during the interaction of a 4.5…6 GeV photon beam with a lead target via the Primakoff effect.

This talk will cover existing measurements of pion polarizability and the current state of the experiment at Hall D in Jefferson Lab.

Primary author(s) : TARASOV, Victor (NRC ”Kurchatov Institute”)

Presenter(s) : TARASOV, Victor (NRC ”Kurchatov Institute”)

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