

Abstract Submitted
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Characterization of Lead Tungstate for Neutral Particle Spectrometer at 12GeV JLab CHRISTIAN RUNYON¹, Trinity School at Meadow View — Precision measurements of the deeply-virtual Compton scattering cross section at different beam energies to extract the real part of the Compton form factor, measurements to push the energy scale of real Compton scattering, and measurements of the basic semi-inclusive neutral-pion cross section in a kinematical region where the QCD factorization scheme is expected to hold all have something in common: the need for detecting neutral particles with high precision and high luminosity. The Neutral Particle Spectrometer (NPS) is a crystal electromagnetic calorimeter preceded by a sweeping magnet to sweep away charged particles. In this presentation I will show the results of PbWO₄ crystal quality studies for the NPS. PbWO₄ is optimal for the NPS due to its small Moliere radius and radiation hardness. The critical aspect for crystal quality, and thus resolution/precision, is the combination of high light output and radiation hardness, which depend strongly on the manufacturing process. We have tested the performance of PbWO₄ crystals, and in particular, measured their light yield, optical transmission, and uniformity and radiation hardness. The homogeneity of the crystal was investigated based on the variation of the transverse optical transmission.

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Christian Runyon
Trinity School at Meadow View

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