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Calibrating the STAR Endcap ElectroMagnetic Calorimeter using Ï€-0's

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The STAR Endcap ElectroMagnetic Calorimeter (EEMC) is an important tool for identifying the particles produced in the forward direction of the STAR detector. These particles are used in the study of the proton's intrinsic angular momentum (â€œspinâ€□). Current calibrations of the EEMC have relied on the energy deposition of minimally ionizing particles (MIPs). To verify the MIP-based calibration, we are re-calibrating it using the energy deposition of the di-photon pairs created by Ï€-0 decays. Using the position and initial energy calibration of the two photon events, we can reconstruct the invariant mass of the parent particle. When this analysis is performed on many photon pairs, we expect a peak in the invariant mass distribution near the Ï€-0 mass. Using the measured mass of this peak, and the known mass of the Ï€-0, we adjust the energy calibration of the EEMC until the two masses are consistent. Work so far has focused on determining how the detector responds to a given photon event, a fundamental step in reconstructing the energy of the parent particle. Highlights from this method and preliminary results will be presented.

Information about the Author:
Benjamin Barber has previously worked for the STAR collaboration during the summer of 2009, studying energy clustering for Ï€-0 analysis. Ben has also represented VU as a Summer Undergraduate Research Fellow (SURF) at the National Institute for Standards and Technology, working on a project to measure the neutron's electric dipole moment. Ben hopes to graduate in the spring, with a BS in Physics and Mathematics.in that field.

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