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Calibrating the STAR Endcap ElectroMagnetic Calorimeter Using Pi-O's

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The default energy calibration of the STAR EEMC (Endcap ElectroMagnetic Calorimeter) uses the energy deposition of minimally ionizing particles (MIPs). An alternate method is to use pi-0's. We are reporting a preliminary proof-of-principle calibration method using pi-0's. This method reconstructs the invariant mass of photon pairs, assumed to be resulting from pi-0 decays, using standard two-body kinematics. When many photon pairs are analyzed, a peak is expected in the resulting invariant mass distribution near the pi-0 mass. Using the measured mass of this peak, and the known mass of the pi-0, a minimization routine adjusts the detector gains to optimize the invariant mass peak of the pi-0. Initial tests suggest that this method is promising.

Information about the Author:

Benjamin Barber is a senior physics and mathematics major. He has spent the summer of 2011 and 2009 working on projects related to the STAR Endcap ElectroMagnetic Calorimeter. He spent the summer of 2010 working at the National Institute for Standards and Technology and will spend the summer of 2012 working at Los Alamos National Laboratory. He currently plans on attending the University of Chicago next year for graduate school, focusing on beam physics.

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