

Abstract Submitted  
for the DNP06 Meeting of  
The American Physical Society

**Behavior of a Radial Time Projection Chamber** PETER BRADSHAW<sup>1</sup>, Old Dominion University, BOUND NUCLEON STRUCTURE COLLABORATION — Using Gas Electron Multiplying (GEM) foils for amplification, the detector allows for three-dimensional representations of particle tracks through two half cylinders filled with gas. Developed for the Bound Nucleon Structure (BONUS) experiment at Jefferson Lab, the RTPC allows experimenters to study the quark composition of the neutron by scattering electrons from deuterium nuclei. The defining feature of the detector is that it allows for a complete view of the interaction of the electron and target gas, including the protons left over after a reaction on the neutron. This experiment seeks to understand the efficiency of the detector and its amplification (signal strength for a given ionization, as a function of detector gas and high voltage), by making a measurement of the amount of energy deposited in the chamber per unit length from cosmic radiation. In order to test each half of the Radial Time Projection Chamber we use an 85% Helium and 15% Dimethyl Ether (85/15 HeDME) and an 80/20 HeDME at optimal voltages to detect cosmic particles. The detector takes an electronic snapshot of the incident particle by examining the charge deposited as a function of time. The importance of this technology should not be underestimated. Radial Time Projection Chambers could, in some applications, replace current Time Projection Chambers and Wire Chambers.

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Date submitted: 14 Aug 2006

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