

Abstract Submitted  
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**Integration of the ATLAS FE-I4 Pixel Chip in the Mini Time Projection Chamber**<sup>1</sup> MAYRA LOPEZ-THIBODEAUX<sup>2</sup>, MAURICE GARCIA-SCIVERES, JOHN KADYK, Lawrence Berkeley National Laboratory, KELSEY OLIVER-MALLORY, University of California, Berkeley — This project deals with development of readout for a Time Projection Chamber (TPC) prototype. This is a type of detector proposed for direct detection of dark matter (WIMPS) with direction information. The TPC is a gaseous charged particle tracking detector composed of a field cage and a gas avalanche detector. The latter is made of two Gas Electron Multipliers in series, illuminating a pixel readout integrated circuit, which measures the distribution in position and time of the output charge. We are testing the TPC prototype, filled with ArCO<sub>2</sub> gas, using a Fe-55 x-ray source and cosmic rays. The present prototype uses an FE-I3 chip for readout. This chip was developed about 10 years ago and is presently in use within the ATLAS pixel detector at the LHC. The aim of this work is to upgrade the TPC prototype to use an FE-I4 chip. The FE-I4 has an active area of 336 mm<sup>2</sup> and 26880 pixels, over nine times the number of pixels in the FE-I3 chip, and an active area about six times as much. The FE-I4 chip represents the state of the art of pixel detector readout, and is presently being used to build an upgrade of the ATLAS pixel detector.

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