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A Large Area Microchannel Plate Detector for Low Energy Proton Detection.

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A custom large area (150 mm x 150 mm) microchannel plate (MCP) detector has been built to characterize the 30 keV proton source at the University of Manitoba (UofM), Canada. Two MCP plates from Incom, Inc. are arranged in the chevron configuration to provide a gain of $\sim 10^6$. The detector is constructed using vacuum compatible materials and is operated in a $\sim 10^{-7}$ Torr vacuum. A 144 pixel anode board covering the full area of the MCP moves charge from the detector into 144 custom amplifiers which are then multiplexed into a LabView DAQ system. The facility at UofM is an ideal facility to characterize low energy proton detectors and is currently characterizing the large diameter silicon detectors used by the Nab neutron beta decay experiment at Oak Ridge National Lab. The construction and operation of the MCP detector will be presented along with rate and beam position stability of the proton source as measured by the MCP detector.

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Primary authors: MAMMEI, Russell (The University of Winnipeg); MACSAI, Nick (The University of Manitoba); GERICKE, Michael (University of Manitoba)

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