

Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

Materials Testing and Performance Optimization for the SAMURAI-TPC¹ K.D. LONG, Tennessee Technological University, W.G. LYNCH, J. BARNEY, Z. CHAJECKI, J. ESTEE, R. SHANE, S. TANGWAN-CHAREON, M.B. TSANG, J. YURKON, Michigan State University — The SAMURAI time-projection chamber (TPC) will be used to make measurements of pion spectra from heavy ion collisions at RIBF in Japan. Such research provides an opportunity to study supra-saturation density neutron-rich matter in the laboratory, and is critical to understanding the structure of neutron stars. It will provide a complete, 3D picture of the ionization deposited in a gas volume, from which particle types and momenta can be determined. The gas-containment volume is composed of surfaces of aluminum and plastic, as well as halogen-free printed circuit board. During multiplication of the ionized electrons at the anode wire plane of the TPC, UV photons are produced. These cause unwanted discharges when they interact with oxidized aluminum surfaces, which have low work functions. This problem can be addressed by application of a suitable conductive paint or epoxy. Paints were investigated to insure they did not contain any materials capable of inhibiting the performance of the detector gas. These investigations were cross-checked by tests carried out using an existing BRAHMS-TPC. Details on these tests and the materials chosen will be shown. The design and optimization of the gating grid, used to limit data collection to triggered events, will also be discussed.

¹This project was funded by the REU grant US-NSF PHY-1062410.

Kenneth Long
Tennessee Technological University

Date submitted: 03 Aug 2012

Electronic form version 1.4