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Spark Monitoring System for sPHENIX TPC GEMs

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The sPHENIX experiment at RHIC requires a high resolution tracking detector in order to distinguish different states of the Upsilon meson to study the evolution of quark gluon plasma (QGP). A Time Projection Chamber (TPC) will serve as a main tracking detector for this measurement. The sPHENIX TPC uses a stack of Gas Electron Multipliers (GEMs) as a gain stage in a reduced ion back-flow configuration. In non-ideal conditions, the high voltage across a GEM stack can create sparks which can cause physical damage and result in dead time as the detector settles. In order to limit the occurrence of sparks in the TPC GEMs it is important to monitor for sparks. In this talk we will present a method for detecting sparks so that GEM voltages can quickly be adjusted in order to prevent further sparking. Further, the development of monitoring electronics which will take in the spark signal and produce a signal that can be digitized at 10 MHz, will be discussed.

Authors: DRIEBEEK, Julian (Stony Brook University); MAJOROS, Tamas (University of Debrecen); DAVID, Gabor (Stony Brook University); GARG, Prakhar (Stony Brook University); HEMMICK, Thomas (Stony Brook University); UJVARI, Balazs (University of Debrecen)

Presenter: DRIEBEEK, Julian (Stony Brook University)

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