

Abstract Submitted
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Extending the Dynamic Range of a Time Projection Chamber¹

JUSTIN ESTEE, Michigan State University , S π RIT COLLABORATION — The use of Time Projection Chambers (TPCs) in intermediate heavy ion reactions faces some challenges in addressing the energy losses that range from the small energy loss of relativistic pions to the large energy loss of slow moving heavy ions. A typical trade-off can be to set the smallest desired signals to be well within the lower limits of the dynamic range of the electronics while allowing for some larger signals to saturate the electronics. With wire plane anodes, signals from readout pads further away from the track remain unsaturated and allow signals from tracks with saturated pads to be accurately recovered. We illustrate this technique using data from the SAMURAI Pion-Reconstruction and Ion-Tracker (S π RIT) TPC , which recently measured pions and light charged particles in collisions of Sn+Sn isotopes. Our method exploits knowledge of how the induced charge distribution depends on the distance from the track to smoothly extend dynamic range even when some of the pads in the track are saturated. To accommodate the analysis of slow moving heavy ions, we have extended the Bichsel energy loss distributions to handle slower moving ions as well. In this talk, I will discuss a combined approach which successfully extends the dynamic range of the TPC electronics.

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