ID de Contribution: **22** Type: **Non spécifié**

Extending Dynamic Range, Calculating and Calibrating dE/dx in the SπRIT TPC

jeudi 18 janvier 2018 15:35 (20 minutes)

This presentation will present a, simple, novel technique to extend the dynamic range and recover the charge information from saturated electronics resulting from large energy losses in a TPC. I will also present the software we use to simulate, and calibrate, the dE/dx distributions for the correct particle identification (PID) in the SAMURAI Pion-Reconstruction and Ion-Tracker (SπRIT) TPC. At some point a track with low momentum, large charge, or both will saturate the electronics of one or several pads in the readout plane, limited by our dynamic range. While the information in these saturated pads are lost, the total charge can estimated by fitting the adjacent unsaturated pads, or the tail of the pad response distribution. Using a simple fit, we have successfully recovered the central saturated pad charge value, correcting the PID shape and effectively extending the dynamic range from a signal to noise ratio of about 700:1 to 1400:1. It is essential for good PID that we predict the correct dE/dx distribution. I have implemented the same relativistic Photo Absorption Ionization (PAI) model of energy loss used in the STAR and ALICE TPC's PID. Having a true theory of the energy loss distribution allows us to predict the full dE/dx distributions and avoid the pitfalls of fitting empirical functions to dE/dx distributions to perform PID. Like the ALICE TPC, we find good agreement between theory and data and I will present the findings of the preliminary calibration of SπRIT TPC. This material is based on work supported by the DOE under Grant No. DE-SC0014530, DE-NA0002923 and NSF under Grant No. PHY-1102511 and the Japanese MEXT Grant-in-Aid for Scientific Research on Innovative Area Grant No. 24105004

Auteurs: ESTEE, Justin (NSCL/Michigan State University); LYNCH, W.G. (NSCL/Michigan State University); CERIZZA, G. (NSCL); ISOBE, Tadaaki (RIKEN); JHANG, Genie (National Superconducting Cyclotron Laboratory); BARNEY, J. (NSCL/Michigan State University); HONG, B. (Korea University); KANEKO, M. (RIKEN/Kyoto University); KURATA-NISHIMURA, M. (RIKEN); LASKO, P. (IFJ PAN, Krakow); LEE, J.W. (Korea University); LUKASIK, J. (IFJ PAN, Krakow); MCINTOSH, A.B. (Texas A&M University); MURAKAMI, T. (Kyoto University/RIKEN); OTSU, H. (RIKEN); PAWLOWSKI, P. (IFJ PAN, Krakow); Dr SANTAMARIA, Clémentine (NSCL); SUZUKI, D. (RIKEN); TSANG, Betty (NSCL/Michigan State University); YENNELLO, S.J. (Texas A&M University); ZHANG, Y. (Tsinghua University)

Orateur: ESTEE, Justin (NSCL/Michigan State University)