

High-Resolution, High-Dynamic-Range Charge Detector for Ion Beam Monitoring

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We present an innovative charge detector with high resolution and wide dynamic range designed to fulfill the requirements of a monitoring system for a high energy ion beam. The detector prototype, constructed using Si planar diodes and a custom readout electronics, underwent extensive testing during HERD and AMS beam tests at CERN SPS facilities. Initial testing showcased the detector's exceptional performance, emphasizing both high resolution and a dynamic range capable of measuring nuclei with atomic numbers ranging from 1 to 80. The prototype's compatibility with fast, quasi real-time data analysis qualifies it as an ideal candidate for online applications. This work presents the results from the testing phase of the prototype, highlighting its capabilities and performance. Ongoing detector development, potential applications, and future developments aimed at enhancing the detector's functionality and versatility are also discussed.

Author: STARODUBTSEV, Oleksandr (Universita e INFN, Firenze (IT))

Co-authors: TIBERIO, Alessio (Università degli Studi di Firenze and INFN, Firenze, Italy); BERTI, Eugenio (Universita e INFN, Firenze (IT)); D'ALESSANDRO, Lel (Universita e INFN, Firenze (IT)); PACINI, Lorenzo (INFN, Firenze (IT)); SCARINGELLA, Monica (INFN Firenze (IT)); MORI, Nicola (INFN Florence); ADRIANI, Oscar (Universita e INFN, Firenze (IT)); Dr BETTI, Pietro (Department of Physics and Astronomy, University of Florence and INFN sezione di Firenze)

Presenter: STARODUBTSEV, Oleksandr (Universita e INFN, Firenze (IT))

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