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Polysilicon Thin Film Amplifiers for Charged Particles Detectors¹ CARLOS AVILA-AVENDANO, ISRAEL MEJIA, LUIS REYES, SERGIY ROZHDESTVENSKYY, CHRISTOPHER PHAM, Univ of Texas, Dallas, BRUCE GNADE, Southern Methodist University, MANUEL QUEVEDO-LOPEZ, Univ of Texas, Dallas — Radiation detection systems consists of two main building blocks: 1) radiation sensor and 2) the electronics to amplify the signal. While great intrinsic efficiency has been achieved by using solid-state sensors and Bi-CMOS amplifiers, there is a lack of reliable solution for cost-effective large-area radiation detectors. Thin film-based technologies can balance their moderated performance with higher geometric efficiency at a lower cost. Thin film transistors (TFT) are commonly used as addressing element in passive pixel sensors (PPS) schemes to transfer the charge from each detector to external crystalline silicon amplifiers. In the case of single radiation events, the PPS scheme must be substituted by an active pixel sensor (APS) approach, where an in-pixel preamplifier has to be integrated with each sensor to be able to detect the small amount of charge generated by the fast single event. In this work, we present the implementation of high performance polysilicon TFTs to integrate preamplifiers for charged particle spectroscopy.

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