

Development of a Read-Out System Using CMOS ASICs for the μ -PIC, Micro-Pixel Gaseous Chamber

<u>S. Iwaki</u>^a, H. Kubo^a, M. Tanaka^b, Y. Fujita^b, H. Ohwada^c, N. Higashi^a, S. Kabuki^a,S. Kurosawa^a, K. Miuchi^a, K. Nakamura^a, J. D. Parker^a, T. Sawano^a, A. Takada^d, M. Takahashi^a, T. Tanimori^a, K. Taniue^a, and K. Ueno^e

^a Department of Physics, Kyoto University, ^b IPNS,KEK, ^c BeeBeans Technologies Co. Ltd

^d Scientific Balloon Laboratory, JAXA/ISAS, ^eCosmic Radiation Laboratory, RIKEN

* e-mail address: iwaki@cr.scphys.kyoto-u.ac.jp

Abstract

For astronomical observations, we have been developing an Electron Tracking Compton Camera (ETCC) based on a gaseous time projection chamber (µ-TPC) with a micro pixel gaseous chamber (µ-PIC), and scintillation cameras. With this camera, we have the balloon born experiment named SMILE. In a balloon-borne experiment, the power consumption is seriously restricted by capacity of batteries. To detect celestial gamma-rays, our Compton camera needs large detection volume and the number of readout channels of µ-PIC reaches more than 3000. Thus the power consumption has become a serious problem. We have developed low power CMOS Front-End ASICs and read-out systems with these chips for a gaseous detector in collaboration with KEK. The chip integrated 16 channels of a charge sensitive front-end amplifier, a shaper, and a discriminator has been designed and fabricated with the TSMC 0.5 µm process. The power consumption is about 18mW/ch. The performance of this chip coupled with a 10 × 10 × 15cm³ µ-TPC has been tested. In this poster, we introduce this new ASIC chip and report the fundamental performance of the TPC with this chips .

