Contribution ID: **164**   Type: **ORAL**

Development of a monolithic pixel sensor based on SOI technology for the ILC vertex detector

Thursday, 14 December 2017 16:10 (20 minutes)

We are developing an silicon-on-insulator (SOI) pixel sensor SOFIST for the vertex detector system of the International Linear Collider experiment. The SOFIST has a pixel size of 20×20 μm^2 with fine position resolution better than 3 μm, which is required as a pixel sensor for ILC vertex detector. The pixel circuit stores both the signal charge and timing information of the incident particles. The sensor can separate hit events with recording timing information during bunch-train collisions of the ILC beam. Each pixel has multiple stages of analog memories and timestamp circuits for accumulating multiple hit events.

We have developed the first prototype sensor SOFIST Ver.1. The Ver.1 chip consists of 50×50 pixels and Column-parallel ADC circuits in a chip size of 3×3 mm^2. We designed the pixel circuit for the charge signal readout with a pre-amplifier circuit and 2 analog memories. The Ver.1 chip was evaluated with 120 GeV Proton beam at Fermilab Test Beam Facility in January 2017. We observed the position resolution better than 1.5 μm.

In this presentation, we report the status of the development and the evaluation of the SOFIST prototype chip.

Primary author: ONO, Shun (KEK)

Co-authors: YAMADA, Miho (KEK); ARAI, Yasuo (High Energy Accelerator Research Organization (JP)); TSUB-OYAMA, Toru (KEK, High Energy Accelerator Research Organization); TOGAWA, Manabu (High Energy Accelerator Research Organization (JP)); Prof. KURACHI, Ikuo (HIgh Energy Accelerator Research Organization); HARA, Kazuhiko (University of Tsukuba (JP)); IKEGAMI, Yoichi (High Energy Accelerator Research Organization (JP)); ISHIKAWA, Akimasa (Tohoku University (JP))

Presenter: ONO, Shun (KEK)

Session Classification: Session14

Track Classification: SOI detectors