

## Talk 4: Muon-induced Soft Errors in FinFET and Planar SRAMs

*Thursday, 13 June 2024 10:15 (20 minutes)*

### Abstract:

Transient malfunctions (soft errors) caused by secondary cosmic ray particles raining down on the Earth have become a major factor determining the reliability of information systems. Until now, the technology to evaluate soft errors mainly focused on neutrons contained in secondary cosmic rays, and techniques to counteract these errors have been developed and accumulated. Meanwhile, it has been reported that muons can also cause soft errors, raising concerns about their frequency of occurrence in cutting-edge devices. While muon irradiation experiments have been reported in recent years, negative muon irradiation to FinFETs has not been reported. Negative muons have the unique physical property of muon capture reaction, and generated secondary ions have larger linear energy transfer (LET) than muons themselves. We performed positive and negative muon irradiation experiments on 12-nm FinFET and 28-nm planar SRAMs at MUSE in J-PARC. This talk will introduce the obtained results and discuss the future research direction.

### CV:

Masanori Hashimoto received the B.E., M.E., and Ph.D. degrees in communications and computer engineering from Kyoto University, Kyoto, Japan, in 1997, 1999, and 2001, respectively. Now, he is a Professor in the Department of Informatics, Kyoto University. His current research interests include VLSI design and CAD, especially design for reliability, soft error characterization, reconfigurable computing, and low-power circuit design. Focusing on the radiation effects, his research interests include radiation effects on integrated systems from physics simulation for SRAM to system modeling for SoCs and commercial chips.

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**Session Classification:** Session 4: Alternative Probes for SEE Testing