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Latest Generation of ASICs for Photodetector Readout

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The OMEGA microelectronics group has designed a new generation of multichannel integrated circuits, the “ROC” family, in AMS (AustrianMicroSystem) SiGe 0.35 μm technology to read out signals from various families of photodetectors. The chip named MAROC (standing for Multi Anode ReadOut Chip) has been designed to read out Multi Anode Photomultipliers (MAPMT), PARISROC (standing for Photomultiplier ARray In SiGe ReadOut Chip) to read out Photomultipliers (PMTs) and SPIROC (standing for SiPM Integrated ReadOut Chip) to readout Silicon PhotoMultiplier (SiPM) detectors and which was the first ASIC to do so.

The three of them fulfil the stringent requirements of the future photodetectors, in particular in terms of low noise, radiation hardness, large dynamic range, high density and high speed while keeping low power thanks to the SiGe technology.

These multi channel ASICs are real System on Chip (SoC) as they provide charge, time and photon-counting information which are digitized internally. Their complexity and versatility enable innovative frontier detectors and also cover spin off of these detectors in adjacent fields such as medical or material imaging as well as smart detectors.

In this presentation, the three ASIC architectures and test results will be described to give a general panorama of the “ROC” chips.

for the collaboration

on behalf of the OMEGA microelectronics group (Orsay MicroElectronics Group Associated)

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