

Latest generation of ASICs for photodetectors readout

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The OMEGA group has designed a new generation of ASICs, the “ROC” family, in AMS (AustriamMicroSystem) SiGe 0.35 μm technology to read out signals from various families of photo-detectors. The chip named MAROC (standing for Multi Anode ReadOut Chip) is dedicated to the readout 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 the readout of SiPM (Silicon PhotoMultiplier) detectors.

The three of them have similar requirements in terms of low noise, low power and radiation hardness and thus similar design: a low noise input stage for amplification, a slow channel for charge measurement, a trigger channel for photo counting, a conversion stage for internal time and charge digitization and a complex digital part to manage the acquisition, the conversion and the readout.

These multi channel ASICs are therefore 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 summary, the three ASIC architectures and the test results will be described to give a general panorama of the “ROC” chips performances designed for photo-detectors applications.

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