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## The GOTTHARD charge integrating readout detector: design and characterization

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A charge integrating readout ASIC for silicon strip sensors has been developed at PSI in collaboration with DESY. The goal of the project is to provide a charge integrating readout system able to cope with the pulsed beam of XFEL machines and at the same time to retain the high dynamic range and single photon resolution performances typical of photon counting systems. The ASIC, designed in IBM 130nm CMOS technology, takes advantage of its three gain stages with automatic stage selection to achieve a dynamic range of 10000 12 keV photons and a noise better than 300 electrons (ENC). The 4 analog outputs of the ASIC, optimized for speed, allow frame rates in excess of 1MHz, without compromises on linearity and noise performances.

This work will present the design features of the ASIC, and will report the characterization results of the chip prototypes (GOTTHARD 0.2-0.3) and of the final chip itself (GOTTHARD 1.0).

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