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### **P1.26: X-ray single photon detection with XPOL-III**

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XPOL-III is a newly developed CMOS ASIC simultaneously working for collecting charge and processing signals inside Gas Pixel Detector. Starting from the architecture of the XPOL ASIC and its successful operation in the IXPE space mission, we implemented specific design changes aiming at increasing the rate capability and the response uniformity.

XPOL-III includes more than 100k pixels at 50 um pitch in a total active area of 15 x 15 mm<sup>2</sup>. Each pixel acts as a charge-collecting anode and is connected to its own charge-sensitive amplifier, followed by a shaping circuit and a sample-and-hold system. The chip, like its predecessor, provides self-triggering capability, with automatic localization of the region of interest (ROI) to be readout for each single photon. A new programmable margin definition has been implemented to reduce readout time. Other improvements include the sensitivity of the trigger electronics and the maximum speed for the serial event readout.

In this work we will describe the design of this new ASIC and its first tests. In particular, in the context of the gas detector application, in which imaging the photo-electron track emitted by single X-ray absorption allows us to measure beam polarization together with timing, imaging and spectroscopy

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