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### **P1.30: Test measurements of ASIC dedicated for X-ray material discrimination by using on-chip time domain integration and CdTe detector.**

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Using time-domain integration (TDI) and a two-dimensional sensor for X-ray imaging of moving objects allows us to overcome the trade-off between SNR and position resolution. Applying on-chip instead off-chip TDI decreases several times required data throughput between an ASIC and the backend. This in turn allows us to significantly simplify the ASIC itself as well as the backend.

We would like to present the results of test measurements of ASIC dedicated for material discrimination X-raying (MDX) by using an on-chip TDI and CdTe detector.

The ASIC consists mainly of 192 x 64-pixel matrix. The pixel size is 100  $\mu\text{m}$  x 100  $\mu\text{m}$ , so the chip size is about 6.4 cm x 2 cm. The chip was manufactured in CMOS 130 nm technology with 8 metal layers. A single pixel analog front-end consists of a charge-sensitive amplifier, a shaper, and three discriminators followed by counters.

First, we will present the results of test measurements done with single energy radiation to evaluate gain and noise for different chip settings. Next results of moving objects imaging are done by using the industrial machine for X-ray for food inspection (continuous energy spectrum). They will be carried out to evaluate spatial resolution and material discrimination ability (Fig. 1) for different object types, movement speed, and temperature. The authors acknowledge funding from the National Science for Research and Development, Poland, contract No. MAZOWSZE/0099/19.

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