**ATLASPix3 – a reticle size HVCMOS pixel sensor designed for construction of multi chip modules**

R. Schimashek¹, A. Andreazza², M. Benoît³, F. Ehler³, G. Iacobucci³, P. Pangaud³, M. Prathapan¹, A. Schoening⁵, E. Vilella⁶, A. Weber¹,⁵, M. Weber⁷, W. Wong³, H. Zhang¹, I. Peri³

¹Karlsruhe Institute of Technology, ²Università degli Studi e INFN Milano, ³Université de Genève, ⁴Aix-Marseille Université, ⁵University Heidelberg, ⁶University of Liverpool, ⁷University Bern

---

**The ATLASPix3 Chip**

- Chip Size: 20.2 x 20 mm²
- Matrix Size: 132 x 372 pixel
- Pixel Size: 150 x 50 µm²
- produced in 180 nm HV-CMOS process
- triggered and untriggered readout
- radiation hard design
- RD53 compatible with a one input and one output line
- capable of hit rates expected for Layer 4 of ATLAS inner tracker at HL-LHC

**Lab Measurements**

- Good Yield: 5 of 6 tested chips fully functional
- no dead or noisy pixels on tested samples
- small detection thresholds achievable
- timing correction possible using per pixel tuning DACs

**Beam Test Measurements**

- telescope with four ATLASPix3 layers built and used in beam test
- Time over Threshold (ToT) measurement is working for all samples
- correlation visible between planes

**Conclusions**

- full reticle sized chip was submitted in April 2019
- Radiation hard design made for ATLAS ITk Layer 4 environment
- The chip is working and has a high yield
- 4-layer ATLASPix3 beam telescope has been developed and is operational
- Good Timing from design and corrections with TbT (offline) and Tuning DACs (online)