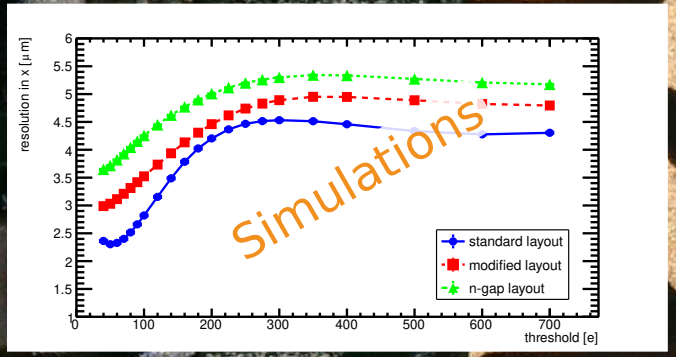
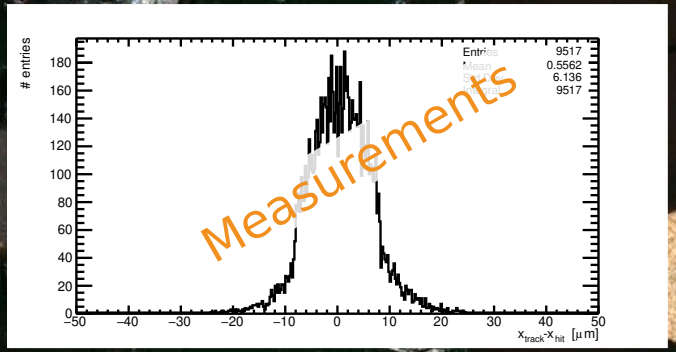
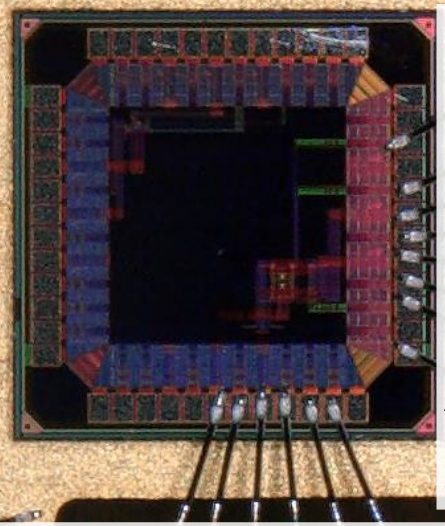
Towards a New Generation of Monolithic Active Pixel Sensors

The TANGERINE project – MAPS in a 65 nm CMOS Imaging Process







Project Goals

- Spatial resolution: 3 um
- Temporal resolution: 10 ns
- Thickness: < 50 um
- In-pixel charge measurement (time-over-threshold)
- Exploit/ explore capabilities for in-pixel logic

Application

- Beam-line instrumentation at DESY
- Future lepton collider/ Higgs factory

Simulation

- TCAD simulations based on generic doping profiles for detailed electric fields
- Allpix2 simulations to make predictions of sensor performance

Measurements

- First test chip investigated at DESY II, CERN PS and MAMI microtron
- Investigated charge sensitive amplifier and sensor performance
- First successful operation of a 65 nm CMOS sensor developed at DESY