## 2nd Allpix Squared User Workshop



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## Transient simulations of monolithic small collection diode CMOS sensors in Allpix Squared

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Monolithic CMOS silicon sensors with a small collection diode are characterised by a low input capacitance that allows for a reduction of power consumption, a lower detection threshold and an increase in signal/noise ratio. However, the small collection diode design gives rise to non-uniform field configurations that are challenging to simulate and model, requiring an advanced simulation approach using a combination of Allpix Squared and 3D TCAD. In this contribution, the combined simulation is presented for the CLIC Tracker Detector (CLICTD), a monolithic pixelated silicon sensor fabricated in a modified 180 nm CMOS imaging process. The simulations are compared to test-beam data for devices with different sensor designs, different sensor thicknesses and different starting materials. Most notably, results for high-resistivity Czochralski wafers are shown, that enable a combination of the small collection diode design with a large depleted volume.

Author: DORT, Katharina (CERN, Justus-Liebig-Universitaet Giessen (DE))
Presenter: DORT, Katharina (CERN, Justus-Liebig-Universitaet Giessen (DE))
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