

10th Beam Telescopes and Test Beams Workshop



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Tangerine: Monte Carlo simulations of MAPS in a 65nm imaging process

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The rapid evolution of High Energy Physics experiments demands the development of improved detectors. The Tangerine project's goal is to develop the next generation of small collection electrode monolithic silicon pixel detectors using the 65nm CMOS imaging process which offers a higher logic density and overall lower power consumption compared to previously used processes. One objective of this project is to construct a telescope to potentially be used at the DESY test beam facility. In monolithic sensors the sensitive volume and readout is in a single chip, which enables a lower material, and reduced cost and production effort compared to hybrid sensors. In order to understand the processes and parameters that are involved in the developments in the new 65 nm technology, a combination of TCAD and Monte Carlo (MC) simulations are used. Allpix Squared utilizes the realistic electric field and doping profiles provided by the TCAD simulations and by the use of MC methods, obtains important quantities such as efficiency, cluster size, and resolution. These results can later be compared to results from test beam experiments.

This presentation will cover the design and setup of the Monte Carlo simulations and present the results obtained so far.

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