Contribution ID: **43** Type: **On-site planned, but remote also possible**

Charge collection simulations in monolithic silicon sensors, based on Allpix2

Novel silicon sensor developments in CMOS imaging processes pose new challenges; in contrast to traditional hybrid sensors the shape and amplitude of the electric field, which is required to collect deposited charge, is highly non linear. Finite element simulations - with Synopsys TCAD - are used to precisely model the electric fields based on doping profile estimations. The time dependent charge collection can also be simulated for a constant charge deposition along a straight line. Unfortunately these simulations are time consuming and are hence not suited to also include charge deposition fluctuations, or generate high statistics samples.
This issue is tackled by the Allpix2 framework, which combines the precise knowledge of electrostatic fields from TCAD with the well understood charge deposition models from Geant4, allowing for rapid and detailed simulation. Allpix2 models the charge deposition, transport, transfer, and digitisation. The summer student will work within the Tangerine team and will be provided with electrostatic fields from TCAD, and is supposed to study the charge collection for different impact positions and extract the detection efficiency, spatial resolution and cluster size using Allpix2. Since we are currently actively working on the sensor design, we cannot further specify the project today, but the student will have the possibility to work on cutting-edge technology developments.

Field

B3: Development of experimental particle physics equipment (hardware-oriented)

DESY Place

Hamburg

DESY Division

FH

DESY Group

ATLAS

Special Qualifications:

Prerequisites: Basics in Linux, ROOT, Unix shell
Nice to have: simulation/silicon experience, Geant4 basics

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