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Pulse Shape Analysis: Simulations with ADL and MGS codes

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Abstract content
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Evaluation of the tracking capacity of the iThemba LABS segmented clover detector requires a detailed analysis of shapes of the traces registered on the 36 electrodes of the detector. The different shapes reflect different interaction positions of the incident gamma ray. In order to determine these interaction positions, raw experimental pulses are compared to a set of simulated ones, each corresponding to a specific position of the interaction. Accurate parameterization of the crystal geometry, space charge distribution, electron and hole mobilities among other things are needed for simulations to reproduce well the response of the real detector. In addition other factors that result from the response of the detector electronics have to be corrected for.

This work aims at performing realistic simulations for the traces of the segmented clover detector. In particular simulations with a second code ADL (AGATA Detector Libraries) [1] were performed and compared with the results from the MGS (Multi-Geometry Simulation) code [2]. The two codes use different approaches to simulate the mobilities of charges, thus it is important to employ and compare both of them. The simulated pulses, generated with the two codes, showed very similar shapes, but they do have slightly different rise times. This difference is attributed to the different parameterization techniques. Experimentally measured pulses will be used for fine tuning the parameterization in the two codes. Such measurements are in progress. Simulations made with the two codes will be presented and discussed in comparison with experimentally measured traces.

[1] B. Bryuneel, private conversations
[2] P. Medina et al., Inst.and Meas. Tech. Conf., Como, Italy, 18-20 May 2004

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
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PhD

Main supervisor (name and email)
and his / her institution

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Would you like to <br> submit a short paper <br> for the Conference
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Yes

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