

Master Thesis in Neutron Particle Physics – Characterization of Detection Techniques for NoMoS

The Stefan Meyer Institute for Subatomic Physics (www.oeaw.ac.at/smi) has a current opening for a Masters student in the NoMoS project. The NoMoS group [1] is working on measuring the decay products spectra in neutron beta decay by using an RxB spectrometer. The RxB spectrometer measures the momentum of charged particles by their drift in a circular magnetic field [2]. Using this method, the group aims to conduct high precision measurements to check for deviations in the unitarity of the CKM matrix that may provide hints to physics beyond the SM.

Scope of the Thesis:

You will work in an international collaboration with a focus towards simulating various detection techniques and properties for low energetic protons (≤ 15 keV) and electrons (< 800 keV). You will also participate in conducting characterization tests for specific detector technologies such as the Silicon based sensors, Microchannel Plates, and Silicon Photomultipliers coupled with scintillating foils. During the course of your thesis, you may also have to travel to France for collaboration meetings.

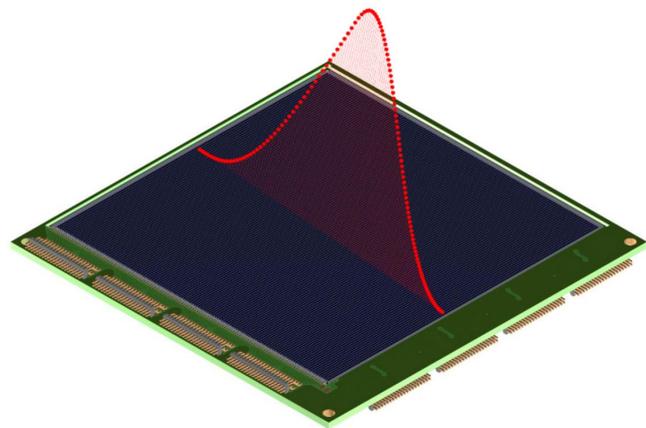


Figure 1: A rendering of how a spectrum will impinge on a detector in 1D. Detector image courtesy of Micron Semiconductor Ltd.

Requirements:

- Ability to communicate in English is essential.
- Good knowledge of C/C++ or any other programming language is expected.
- Some knowledge of ROOT, PENELOPE or Geant is highly appreciated.
- Hardware knowledge of particle detection systems is also welcome.

Planned start: April 2019

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References:

- [1] G. Konrad (2015), *NoMoS: Beyond the Standard Model Physics in Neutron Decay*, [PoS\(EPS-HEP2015\) 592](#).
- [2] X. Wang et al. (2013), *RxB drift momentum spectrometer with high resolution and large phase space acceptance*, Nucl. Instrum. Meth. A 701, 254-261, [arXiv:1209.6595](#).