Contribution ID: **6**   Type: **Talk**

Track and Vertex Reconstruction on GPUs for the Mu3e Experiment

Thursday, 11 September 2014 10:00 (30 minutes)

The Mu3e experiment searches for the lepton flavour violating decay mu->eee, aiming at a branching ratio sensitivity better than 10^(-16). To reach this sensitivity, muon rates above 10^9 mu/s are required, which are delivered by the Paul Scherrer Institute in Switzerland. A high precision tracking detector composed of ~300 million pixels combined with excellent timing resolution from scintillating fibers and tiles will measure the momenta, vertices and timing of the decay products of muons stopped in the target.

The trigger-less readout system will deliver about one Tbit/s of zero-suppressed data. A network of optical links and switching FPGAs sends the complete detector data for a time slice to one node of the filter farm. An FPGA transfers the event data to the GPU via PCIe direct memory access. The GPU finds and fits tracks using a 3D tracking algorithm for multiple scattering dominated resolution. In a second step, a three track vertex fit is performed, allowing for a reduction of the output data rate to below 100 MB/s. The talk discusses the implementation of the fits on the GPU, which already runs at more than 10^9 track fits/s.

Primary author: Ms VOM BRUCH, Dorothea (Physikalisches Institut, Universitaet Heidelberg)

Presenter: Ms VOM BRUCH, Dorothea (Physikalisches Institut, Universitaet Heidelberg)

Session Classification: GPU in Low Level Trigger (1/2)