Contribution ID: **277**   Type: **Oral Presentation**

Monte Carlo simulation using GEANT 4 of MuSR

Wednesday, 13 July 2011 13:45 (15 minutes)

<p>GEANT 4 is a C++ library developed by CERN to simulate particle physics experiments. However, GEANT 4 can be also be used for other applications that need not have anything to do with particle or high-energy physics. Here we discuss an application of GEANT 4 that simulates the EMU Spectrometer for Muon Spin Relaxation measurements at the ISIS facility in the Rutherford Appleton Laboratory. Both the incident muon and decay positron trajectories are affected. This changes the stopping location of muons for small samples and also the efficiency of the positron detection, in a strongly field dependent way. This leads to a systematic field dependent false asymmetry. The simulation has been performed in support of the interpretation of experiments todetermine the effect on diamond samples doped with muonium, which is a known analogue of the hydrogen atom.

Level (Hons, MSc,
   PhD, other)?

PhD

Consider for a student
   award (Yes / No)?

yes

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

yes

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Session Classification: Theoretical

Track Classification: Track G - Theoretical and Computational Physics