Compton Electron Tracking: Meeting Notes

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| 23/10/13 10:00-12:00 | Liverpool University |
| Attendees: Ian Lazarus, Marc Labiche, Amina Patel, Matt Wilson. Andrew Boston , Daniel Judson, Laura Harkness |
| Apologies:  |

# Meeting Notes

Amina presented her work on the detector simulation in GAMOS using the same set-up as Marc had simulated in GEANT 4.9.5. A source of 141keV photons, 3cm from a 4x4cm Si detector, emitting 2M in all directions was simulated. Filtering was used so that only events where Compton scattering events occurring in the Si detector, with the Compton electron remaining within the Si detector, were recorded. For example, GAMOS recorded ~6500 events whereas GEANT recorded only ~5400 events. The cause for this difference was debated and it is believed that this could be due to the filtering/vitos of events, the physics packages used or the version of GEANT 4 used (4.9.4 vs 4.9.5). Marc and Amina will investigate further.

Matt presented his work on the CIE calculations in COMSOL to give a detector response to combine with the output from the MC simulations. There are current some discontinuities in the finite element calculations due to changes in mesh sizes in the simulation. Finer and larger meshes are converging on a solution to this problem. COMSOL can be accessed remotely if Amina would like to conduct some of this work to include it in her thesis.

**It was agreed that the simulations should focus on 1mm thick Si detectors and 141keV sources as this gives the best performance and should be used as a starting point.**

Daniel spoke about the reconstructions and requires x,y,E,t for the detector response output (thin scattering detector so no Z required). He is currently testing the reconstructions using the exact information directly from the MC simulations. This work will be presented with a poster at the UCL Pre-Clinical Nuclear Imaging Workshop. This will be compared to the reconstructions when the information is limited from different detector geometries and responses. 100s-1000s of events are required for the reconstruction.

Including more members in the collaboration was discussed. The UCL workshop was seen as an ideal opportunity to meet up with Brian Hutton to present the project to him and ask him to be a stakeholder in the project. As the project matures and larger funding is required it was suggested to speak to Trish Murray (£8M from MRC for pre-clinical medical centre at Liverpool) and to contact the British Nuclear Medicine Council. A plan for future funding was discussed with the outcome of:

* **Liverpool to apply for a mini-IPS in Jan-Feb 2014 to carry on simulation work**
* **STFC to apply for further CfI funding to build a test structure for a small ASIC process. Matt to speak to Mark Prydderch to see what can be done FY 2013-14.**
* **Summer 2014 collaboration will seek CLASP Healthcare funding to move towards building a first detector. This will include clinical pull, Innovations (Liverpool and STFC), Liverpool, STFC and UCL-H.**
* **NIHR i4i, TSB, PoC….beyond a CLASP call (2-3 years away).**

# Actions

1. Marc and Amina will investigate the cause of the difference in output of the simulations.
2. Matt to email Brian Hutton (cc Andy) to arrange to meet him at UCL workshop or another time.
3. Matt to meet with Mark to discuss CfI and test structures for 2014-15
4. Liverpool to contact their Innovations people about potential partners/stakeholders for CLASP.
5. Matt to make IP enquiries – should we have an agreement in place to share IP in the collaboration (and as it gets wider).