CERN FCC Study Group

Held on: 27 October 2021
Present: A Ciarma, G Ganis, M Boscolo, M Koratzinos, E Perez, A Sailer,
Excused: P Janot
Agenda: https://indico.cern.ch/event/1089745/
Next meeting: 17 November 2021

Status of Things

Topical meeting on SR

GG summed up the topical meeting on SR. The meeting was quite informative and allowed to make progress on the topic. All the presentations went in deep details.
MDISim and SynRad+ have similar ambition in terms of precision. They start from the same lattice output, produced by MAD-X. MDISim translates the MAD-Xinput in geometry and field information for Geant4, and uses Geant4 to track the beam and simulate the SR, including the interaction of the photons with all the relevant elements. In particular it is possible to extract a list of particles coming out of the beampipe in the interaction region, to be tracked in the detector. SynRad+ uses the MolFlow+ ultra high-vacuum technology to calculate flux and power distribution on a surface caused by synchrotron radiation. Also in this case it shpuld be possible to get a list of particles coming out of the beampipe in the interaction region, although this was probably never done so far. Also SynRad+ focuses on reflection of photons inside the elements (which does in a more complete way then MDISim) and does not include some effects relevant for 'outside' such as the compton effect. To be understood the real relevance of this.
SYNC_BKG is actually a set of two programs, SYNCH_BKG itself and MASKING. The machine elements are input 'by hand', possibly derived from MAD-X. The programs include less effects (for example, no fringe fields) but run very fast, and have been used in several cases to get a first feeling of the level of SR to be dealt with in a given machine. The output was already 'integrated' to iLCSoft by A Kolano; she used a standalone script which is still available. Y Voutsinas tried to reproduce her results with the script with no real succes. Nonetheless, the script should allow making progress in the understanding of the SYNC_BKG output.

Code availability

- MDISim: M Luckhof repositories not available anymore; H Burkhardt has now the code
- SynRad+: binaries available from https://molflow.web.cern.ch/node/107
- SYNC_BKG: M Sullivan can send the code (AC in contact with him)

Actions

AC will start from SYNC_BKG. He will first try to understand the output format and then how to reproduce it. AC should also get A Kolano script and evaluate its relevance and usefulness. We will try then to integrate all that in the software stack.

Geometry matters

Not much progress. Through M Ady MB got knowledge of cad-to-geant4-converter, a python package that converts CAD geometry into GDML via STL files and injection of material information. The approach seems conceptually similar to the one adopted by Nikos for feeding FLUKA with CAD originated information. Proposal - from MK - is to have the author of this package (Andrii Tikhonov) or Marton Ady to present the package in this meeting.

AoB

MK reports that he asked PJ and M Benedikt for a template for technical reports (no reply yet). This was having in mind Nikos immediate needs, but it could be of interest for other people, and in general a nice thing to have. GG will ping PJ.

Action list

1. AC to get the SYNC_BKG/MASKING codes from M Sullivan and an example of output
2. AC to get A Kolano script for SUNC_BKG output interpretation
3. GG to invite Marton Ady or Andrii Tikhonov to present cad-to-geant4-converter
4. GG to ping PJ about a template for technical reports