

Software WG : Proposal status (DRD4 : WG 4.4)

DRD4 community meeting

From DRD4 preparation team

General context

- Main goals:
 - Address the software issues related to the next generation of detectors developed in DRD4
 - Develop software packages of common interest for the DRD4 community
 - Share experiences from software developments in different projects

- Current survey:
 - 11 groups expressed an interest in this WG
 - Some groups listed projects they wish to work on, in the WG
 - Some other groups may provide general support for this WG.

WG 4.4: Software projects

- Projects/activities proposed:
 - Simulation :
 - ❖ Speed up simulations : (2 groups)
(This includes the use of GPUs for photon ray tracing)
 - ❖ Develop tools for accurate modelling of photon detectors (3 groups)
 - ❖ Create fast tools for simulating the optical layouts of RICH detectors (1 group)
 - ❖ Simulate the readout (1 group)
 - Reconstruction :
 - ❖ Use new architectures such as GPUs (2 groups)
 - ❖ Algorithms for real-time data analysis, monitoring and calibration (1 group)
 - Machine learning:
 - ❖ Develop new PID algorithms based on machine learning. (4 groups)
 - Knowledge exchange
- Special categories :
 - Simulation of RFPMT (1 group)
 - Simulation and reconstruction of gamma ray interactions in crystals (1 group)

General plans

- WG members may work on the design and implementation of new software tools relevant for the next generation of Cherenkov detectors.
- This may also help with the development of PID techniques foreseen in WG 4.2.
- The WG members may collaborate with other software organizations such as HSF and WLCG, whenever needed.
- WG gives opportunities to share experiences from different experiments and provide help to new members. However, this requires provisions to be made so that experts in different aspects of software are available to provide the necessary support. At present there are only a limited number of experts.
- Initial validation of some of the software tools developed in the WG:
 - To facilitate this, a good option would be to create two examples of RICH detector description in the WG. These will be for:
 - ❖ a detector in the forward geometry
 - ❖ a detector in the barrel geometry
- Spin-off
 - Developing software in the GPUs and developing machine learning techniques have applications outside HEP.
 - The simulation of optical photons is not limited to Cherenkov detectors and can be used for different detectors that use optical photons.