

## GeantV – Next generation detector simulation toolkit

GeantV is an R&D project with the goal to develop the next generation simulation software toolkit modeling the passage of radiation through matter. The new engine exploits fine-grain parallelization, SIMD, data locality and vectorization for maximum throughput in modern CPU architectures, and systems with accelerators such as GPGPU, Xeon® Phi, Atom or ARM.

The lecture will introduce students to the Geant4 and GeantV detector simulation toolkits. The concepts of parallel computing and the programming techniques utilized in modern computing architectures will be explained. Preliminary computing performance results for the GeantV prototype under development will be presented.

The lab activities will include installation of dependency external packages, cloning of code repositories, local configuration, as well as building and running simple examples. Performance comparisons between GeantV and Geant4 will be demonstrated, and vectorization exercises will be suggested, with expert support at hand.