# Notes from Jan 30th face-to-face meeting

At the end of the one-day meeting, we had a wrap-up discussion on project status and next steps.

Memoization of Geant4 hadronic cross section and integration into Geant4

- Implementation and integration: Paul will wrap-up the method implementation (Douglas Peucker approximation) and handle the code to Andrea. The next step is to figure out what the effect of varying the tolerances is on computing performance and physics output. The tolerance parameter will be exposed to users in some way, but this is not the only parameter of the model.

- Release: The technical implementation will be finished in time for the beta release so that this option is in the Geant4 public release this year (2015).

- Outlook: Hadronic physics takes ~10% of the total clock time of the cmsExp application running inclusive ttbar events. Then, 10% is the upper limit to any potential time savings.

Code reviews

- Krzysztof passed the results from the recent EM code review to the Geant4 code developers and some suggestions have already been implemented. What is next, random number generation, physics vector, transportation?

- Transportation is a core Geant4 element and a code review has the potential to yield big gains. Since there are R&D efforts to revisit transportation/geometry from the ground up, a possibility is for Geant4 to leverage on this R&D rather than invest in improving the current transportation code.

Performance of G4 EM processes with TAU

- Boyana is working to make performance experiments easier, faster, more reproducible, incorporate multi and many core analysis, and automation of iterative analysis.

- In the future, she will work on many core optimizations (GPUs, Intel MIC), what computations should be done on the accelerator. Performance results for the EM physics GPU prototype are available now at the kernel level, and finer grain information is coming in the next couple of months; a student is testing Soon's code.

Performance of VecGeom on CPU, CPU

- Azemat showed first performance results on VecGeom.
- Future work: for each program unit (class, function, loop, block) he will calculate flops and bytes, identify inefficiencies in code execution.

GeantV

- The next frontier for this group is to start doing performance studies of GeantV code. Soon, Philippe, Guilherme will send the necessary info to move ahead in this direction.