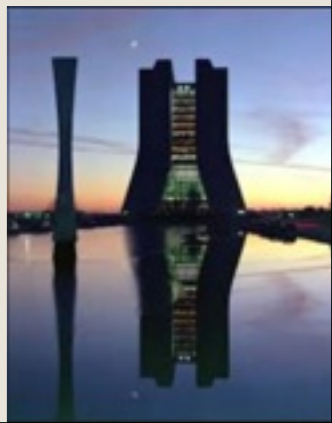




GeantV - Geant4 FNAL meeting



FNAL meeting
January 20-24, 2014





☆ **Gabriele Cosmo**

15 January 2014 10:58

To: project-lcg-simu (LCG applications area simulation project)

[Hide Details](#)

Simulation project leader



Dear colleagues,

following the changes in the organisation of the PH/SFT group announced by John Harvey last Monday, I would like to welcome Federico Carminati (CERN PH/SFT) as the new leader of the PH/SFT Simulation team and new convener of the LCG Simulation Project.

Federico will bring his extensive experience in simulation to follow the activities of the various SFT simulation projects: Geant4 and Physics Validation, Generator Services and the Geant Vector R&D.

Many thanks to Federico for accepting the position.

Best regards,
Gabriele Cosmo

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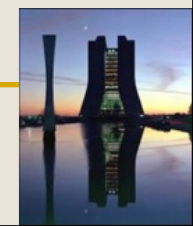
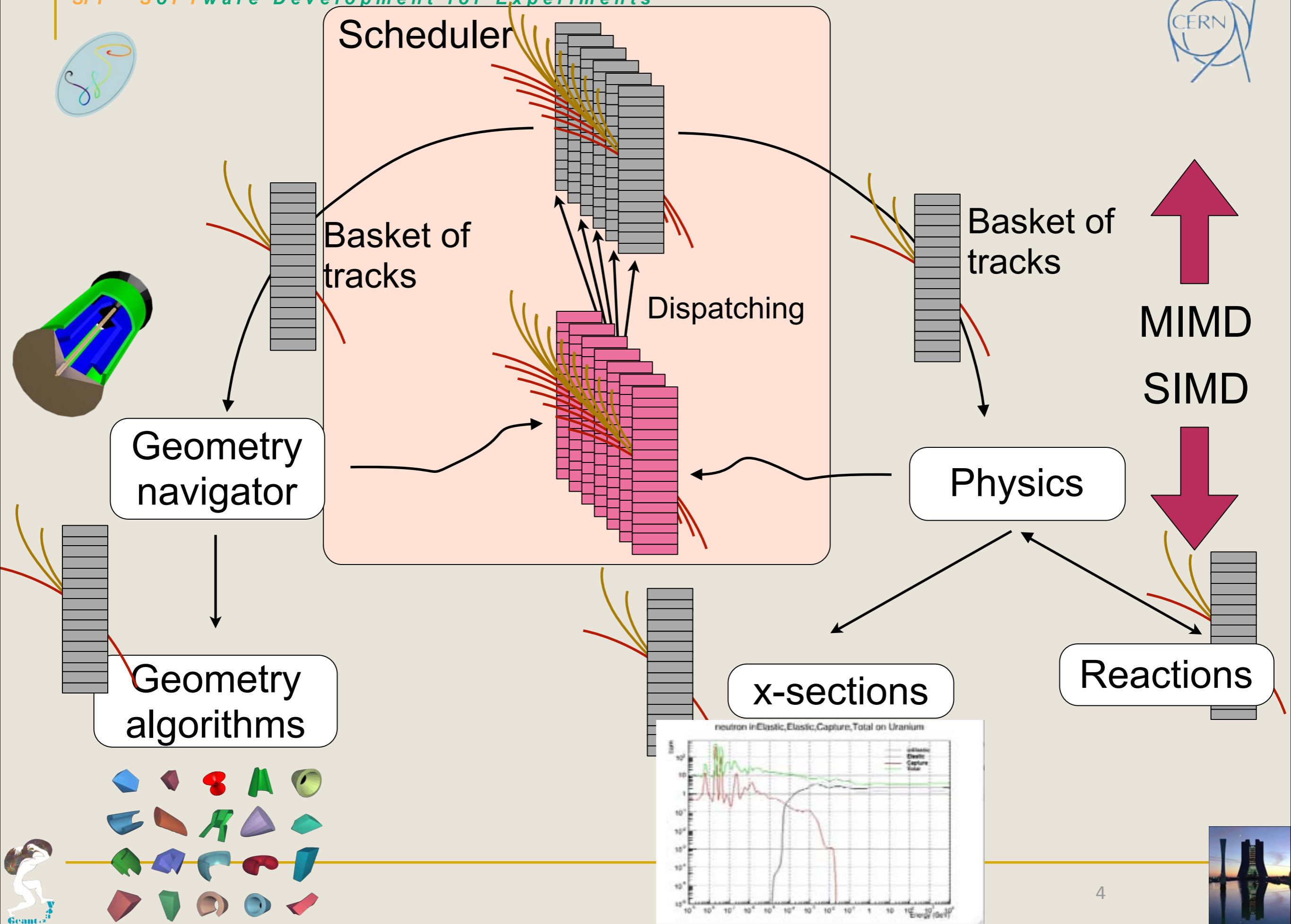




Geant 4 + V

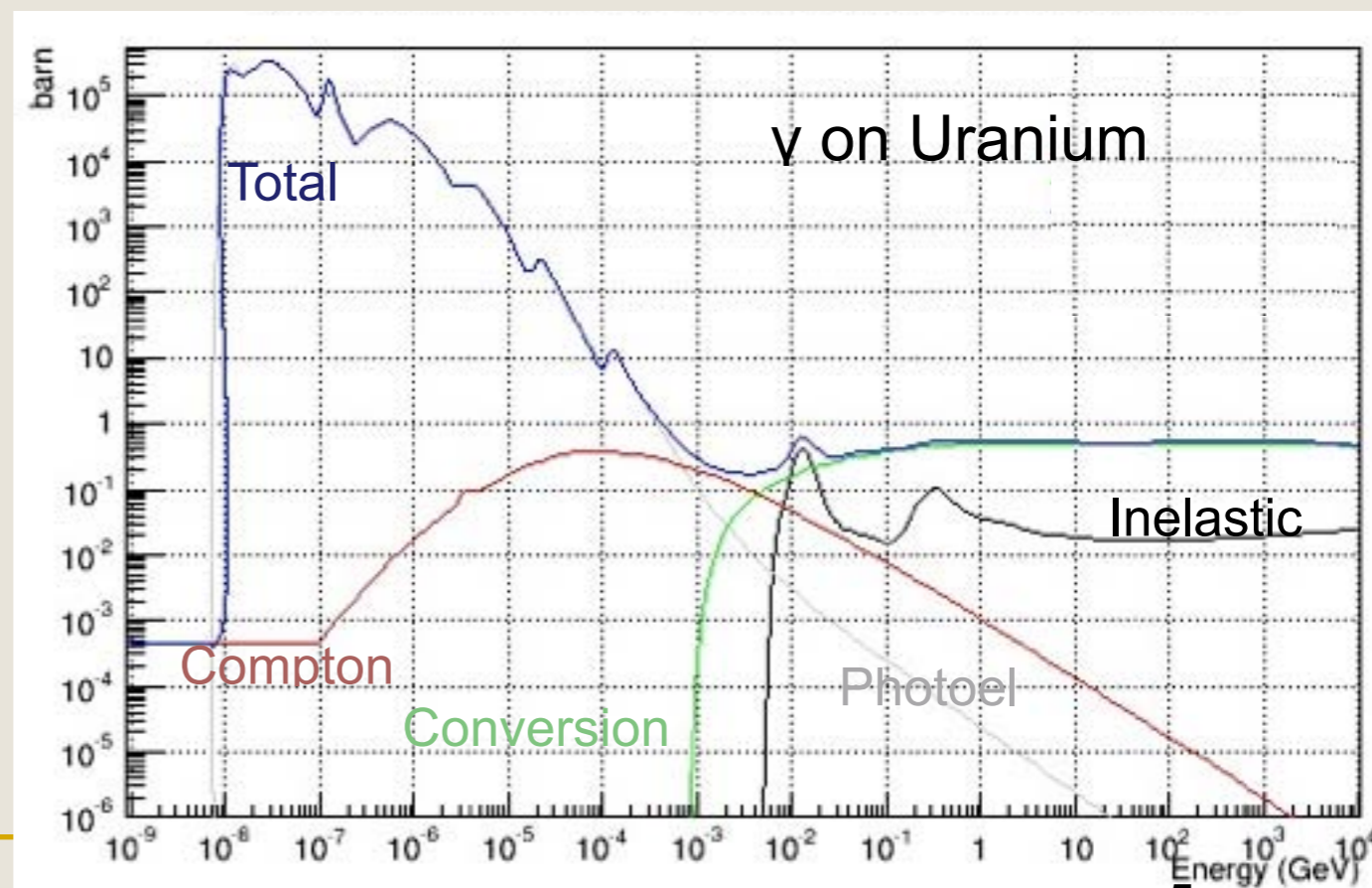
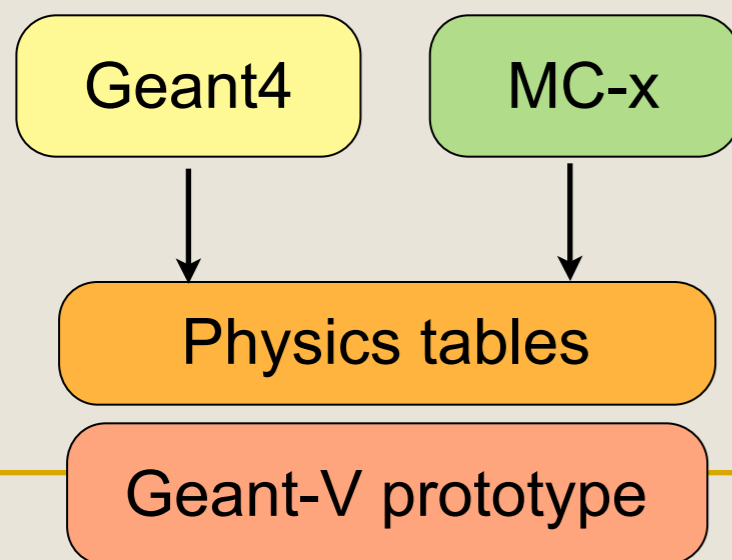
- Better communication and synergy between the two projects
 - Which will stay of course separate for the moment!
- Streamlining of the activities within SFT
- Better communication with “other sciences”
 - But for Geant4 this is already a reality
- Workshop in preparation for an HEP software initiative





Physics

- A lightweight physics for realistic shower development
 - Select the major mechanisms
 - Bremsstrahlung, e+ annihilation, Compton, Decay, Delta ray, Elastic hadron, Inelastic hadron, Pair production, Photoelectric, Capture + dE/dx & MS
 - Tabulate all x-secs (100 bins -> 90MB)
 - Generate (10-50) final states (300kB per final state & element)
- It will not be good Geant4, but but it could be the seed of a fast simulation option
- Independent from the MonteCarlo that actually generates the tables






Where are we now?

■ Scheduler

- The new version, hopefully improved of the scheduler has been committed and we are testing it

Scheduler
(A.Gheata, F.Carminati
+ R.Brun)



■ Geometry

- The proof or principle that we can achieve large speedups (3-5+) is there (see A.Gheata's talk), however a lot of work lays ahead


Geometry
(S.Wenzel, A.Gheata)



■ Navigator

- "Percolating" vectors through the navigator is a difficult business. We have a simplified navigator that achieves that (S.Wenzel), but more work is needed here

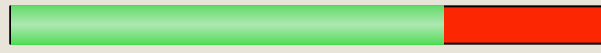
Navigator
(S.Wenzel, A.Gheata)



■ Physics

- Can generate x-secs and final states and sample them, but there are still many points to be clarified with Geant4 experts

Physics
(F.Carminati,
J.Apostolakis + R.Brun)





Physics Specific work

- Many issues opened in Jira about physics interactions
- “SFT-private” version of G4 created
- Opportunity to verify x-sections as extracted against x-sections as sampled and data
 - An immediate issue with ionisation x-section
- Some specific problems in the sampling code
 - The activation of the capture mechanism causes the code to crash
 - The sampling of the multiple scattering angle is problematic, as it clearly gives wrong results. It would be important to see whether this can be done by the SampDisOne routine that is already sampling the other interaction





Testing - benchmarking

- Standard benchmark Geant4 - GeantV
 - With all the caveats and so on, at the end it is only a problem of communication
- Simple “physics” benchmark for GeantV
 - We decided to use `geant4_vmc/examples/E03` because is a simple calorimeter
 - The idea is to replace the had part with the prototype x-sec





Developments for Geant4

- It would be nice to make of SampDisOne a standard facility in Geant4 to sample processes
- The same for the extraction of the x-sections
- Clarify the situation of USolids





Programme for the week

- Precise the common work programme for GeantV
 - Introduce common deadlines
 - Share work on different items
- Work together on the code
- Discuss ongoing work on Geant4 from the FNAL team
 - Mostly an information session for me ;-)

