

Geant4 Hadronic Group Work Plan for 2015

1st version, 28 January 2015

Model development (1)

STRING MODELS

- Revision, improvement, tuning of FTF Reggeon cascading
 - V. Uzhinsky (1)
- Validation of FTF for the beam energy scan (BES) program at RHIC
 - V. Uzhinsky (2)
- Validation & tuning of FTF for nucleus-nucleus interactions
 - A. Galoyan
- Testing of HIJING + Reggeon cascading
 - Charged particles spectra in Pb-Pb collisions at 2.76
 - Comparison with Geant4 FTF code
 - K. Abdel-Wagel (1 & 2)

Model development (2)

- Code improvement of FTF
 - A. Ribon (with advices and help by Gunter) (1 & 2)
- Revision, improvement and tuning of QGSM
 - V. Uzhinsky (1)
- Study of QGSM implementations in cosmic rays MC generators
 - V. Uzhinsky (1 & 2)
- Study of mixing of $\pi^0 / \eta^0 / \eta'^0$ and ρ^0 / ω^0
 - V. Uzhinsky (1 & 2)
- Developing and testing of hadron inelastic diffraction
 - V. Grichine (1)

Model development (3)

- Tuning of FTF model for antiproton-proton, antiproton-nucleus and light antinucleus-nucleus interactions from annihilation at rest to $P_{lab}=1000$ GeV
 - A. Galoyan
- Tuning and validation of FTF model for multiplicities and kinematical characteristics of strange mesons and hyperons produced in proton-proton, proton-nucleus, antiproton-proton and antiproton-nucleus reactions.
 - A. Galoyan

Model development (4)

BERTINI MODEL

- Re-evaluate overall performance (both thin and thick target) of physically-motivated nuclear model parameters and using PreCompound for de-excitation
 - M. Kelsey (1)
- Extend kaon and hyperon final-state tables to 32 GeV (same as pi-N) and 9-body final states
 - M. Kelsey & D. Wright (2)
- Investigate redesign of secondary propagation using a smooth 1D nuclear potential, with stepwise curved trajectories
 - M. Kelsey

Model development (5)

INCL++ MODEL

- Improvement of the high-energy reactions in INCL by including η° and ω° production
 - J-C. David (2)
- Maintenance of INCL++ model
 - J-C. David, D. Mancusi (1 & 2)

Model development (6)

PRECOC / DE-EXCITATION MODEL

- Revision of photon evaporation
 - J.M. Quesada Molina & M. Cortes Giraldo (1)
- Revision of statistical break-up
 - J.M. Quesada Molina & M. Cortes Giraldo (2)
- Improving the physics performance of de-excitation
 - V. Ivanchenko

Model development (7)

HP MODEL

- Merge neutronHP with particleHP
 - T. Koi (1) in collaboration with CIEMAT group
- Update LEND package
 - T. Koi (2)
- Add test for FissionFragment model in NeutronHP. Implement suggestions into FissionFragment example. Update FissionFragment model code as needed
 - B. Wendt (1 & 2)
- Keep maintaining the LLNL Fission Library inside Geant4. Possibly incorporate the Fission Reaction Yield Event Algorithm (FREYA) into Geant4
 - J. Verbeke

Model development (8)

RADIOACTIVE_DECAY

- Solve the non-reproducibility for IT reactions
 - D. Wright (1)
- Complete the re-design of the package
 - D. Wright (2)
- Add correlations for gamma emission
 - D. Wright (2)
- Extend as much as possible the Geant4 code to allow for the simulation of Super Heavy Elements (SHE)
 - L. Sarmiento
- Other contributions
 - L. Desorgher and A. Howard

Model development (9)

ELASTIC MODEL

- Development (and validation) of low-energy neutron elastic scattering
 - V. Grichine (2)
- Validation of neutron elastic scattering with TARC
 - A. Howard
- Tuning of G4classes for elastic interactions of antiprotons and light anti-nuclei with protons and nuclei
 - A. Galoyan

Model development (10)

OTHER MODELS

- Add new parameter set for QMD
 - T. Koi (1)
- Neutrinos: complete the Geant4 interface to GENIE
 - D. Wright (2)
- Evaluate and eventually implement the **charge-exchange process**
 - V. Ivanchenko (2)
- Code improvement of Chips-extracted **quasi-elastic**
 - W. Pokorski (2)

Cross Sections

- Complete test suite for hadronic cross sections (with data)
 - W. Pokorski
- Inclusion in G4 of the fast hadronic cross section system
 - A. Dotti

Validation & Testing

- Composition, monitoring and validation of physics lists for the Intensity Frontier (IF) (1 & 2)
- Muon stopping and capture development and validation, Test48 (1 & 2)
- Maintenance, and periodic execution of Test19, Test23, Test47, Test48, Test75 (1 & 2)
- Physics highlights release page (1 & 2)
- FNAL Team: D. Elvira, K. Genser, H. Wenzel, J. Yarba