Geant4 Hadronic Group
Work Plan for 2016

3rd version, 29 February 2016

String models (1/3)

- Validation of **FTF** model for nucleus-nucleus interactions
  - V. Uzhinsky (1)
- Description of **FTF** model: improvement of the Geant4 physics reference manual, and preparation of a paper
  - V. Uzhinsky (2)
- Tuning and improvement of **QGS** for hN and hA interactions
  - V. Uzhinksy (1)
- Revision of the **QGS** documentation in the Geant4 physics reference manual
  - V. Uzhinksy (2)
- Investigation of string implementations in other codes, and first attempt to include hard scattering in **QGS**
  - V. Uzhinksy (2)

String models (2/3)

- Development and validation of the low-mass diffraction dissociation model, and low-energy extension of hadron string models
  - V. Grichine

- Code improvements of string models (FTF and QGS)
  - A. Ribon (1 & 2)
- Hadronic shower effects of string models
  - A. Ribon (1 & 2)

String model (3/3)

- Tuning and validation of **FTF** model for strange meson's and hyperon's production in nucleon-nucleon, and nucleon-nucleus interactions
  - A. Galoyan
- Tuning of **FTF** model to improve baryon's spectra in proton-proton, antiproton-proton, proton-nucleus, antiproton-nucleus, and nucleus-nucleus interactions
  - A. Galoyan
- Extension of the validation test-suite for string models (test22) with the above data, and for nucleus-nucleus
  - A. Galoyan
- Validation of the improved HIJING code on Au+Au interactions at RHIC energies (19, 62.4, 130 and 200 GeV)
  - K. Abdel-Wagel (1 & 2)

Intra-nuclear Cascade models

- **Bertini** cascade parameter tuning
  - D. Wright (1)
- Completion of kaon improvements in **Bertini** cascade
  - D. Wright (2)

- Maintenance of **Binary** model
  - G. Folger (1 & 2)

- Maintenance of **INCL++** model
  - J-C. David, D. Mancusi (1 & 2)
- Implement Eta and Omega in **INCL++** model
  - J-C. David, D. Mancusi (1 & 2)

Precompound / De-Excitation models

- Migration of Fermi break-up, GEM, Evaporation, and PreCompound models to use the common data on nuclear levels (which also allows production of isomers)
  - V. Ivanchenko (1)
- Revision of Fermi break-up
  - J.M. Quesada Molina & M. Cortes Giraldo
- Further tuning of de-excitation models
  - V. Ivanchenko & J.M. Quesada Molina (1 & 2)
- Include simulation of correlated gamma emissions
  - J. Detwiler & V. Ivanchenko
- Complete the validation with the **n_TOF** beam
  - M. Cortes Giraldo & J.M. Quesada Molina

ParticleHP model (1/2)

- Maintenance of ParticleHP, and adding test of charged particles in system testing
  - T. Koi
- Inclusion of the interference term for charged particles
  - P. Arce
- Develop test suite for WendFissionFragment component of ParticleHP
  - B. Wendt
- Improvements in the treatment of inelastic reactions in C12
  - E. Mendoza & D. Cano Ott
- Development of LEND
  - B. Beck, T. Koi, J. Verbeke, Dough Wright

ParticleHP model (2/2)

- Maintenance and update of the IAEA Geant4 neutron data libraries website
  - E. Mendoza & D. Cano Ott
- Creation and validation of new neutron data libraries released recently
  - E. Mendoza & D. Cano Ott

- Model low-energy (~meV) neutron scattering in both poly- and single-crystals
  - T. Kittelmann & X. Cai (1 & 2)

Radioactive Decay model

- Radioactive decay improvements
  - D. Wright (1 & 2)
- Extension to Super Heavy Elements (SHE)
  - L. Sarmiento (1)
- Inclusion of beta-delayed emissions of protons and neutrons
  - L. Sarmiento (2)
- Maintenance of the RDM database and testing of biasing
  - L. Desorgher
- Make it easier the simulation of new level scheme, including E0 transitions and angular effects
  - M. Venhart
- Other contributions : A. Howard, T. Koi, M. Maire, M. Taylor

Elastic models

- Development and validation of hadron elastic models
  - V. Grichine

- **TARC** : create a new validation test;
  investigate particle_hp, RDM and biasing options
  - A. Howard

Other models

- Investigate problem in selection of elemental scatterings in **QMD**
  - T. Koi
- Neutrinos: complete the Geant4 interface to **GENIE**
  - D. Wright (1)
- Evaluate possibility of adding a **charge-exchange** model
  - V. Ivanchenko
- Muon stopping code-factorization and introduction of **muonic atoms**
  - K. Lynch & K. Genser

Cross Sections

- Complete test suite for hadronic cross sections (with data)
  - W. Pokorski
- Inclusion of the fast hadronic cross section system, and its validation
  - A. Dotti

Validation & Testing

- Composition, monitoring and validation of physics lists for the Intensity Frontier (IF) (1 & 2)
- Maintenance, and periodic execution of Test19, Test23, Test47, Test48, Test75 (1 & 2)
- Physics highlights release page (1 & 2)

- Development of the infrastructure for generating MC predictions with an uncertainty band for the Bertini model, to be extended then to other models (with D. Wright of SLAC)
- Development of interfaces for Geant4 hadronic models to be used by GENIE (with D. Wright of SLAC)

- FNAL Team: K.Genser, R.Hatcher, H.Wenzel, J.Yarba