Geant4 Hadronic Group
Work Plan for 2017

2nd version, 26 January 2017

String models (1/2)

- Implementation of rotating strings in **FTF** model
  - V. Uzhinsky
- Revision and improvement of **QGS** (additional reggeon exchanges and transverse-mass distributions...)
  - V. Uzhinksy
- Tuning and validation of **QGS**
  - V. Uzhinksy
- Documentation and journal papers for **FTF** and **QGS**
  - V. Uzhinksy
- Hadronic shower effects of **FTF** and **QGS**
  - A. Ribon
- Code improvements of **FTF** and **QGS**
  - A. Ribon

String models (2/2)

- Tuning and validation of **FTF** model for strange meson and hyperon production in proton and anti-proton interactions with proton and nuclei
  - A. Galoyan
- Extension of the validation test-suite for string models (test22) with the above data, and for nucleus-nucleus; inclusion also of neutron production in proton and anti-proton interactions with nuclei (comparing also BERT)
  - A. Galoyan
- Further improvements and validation of HIJING for p-Pb and Pb-Pb collisions at LHC
  - K. Abdel-Wagel

Intra-nuclear Cascade models

- **Bertini**
  - Parameter tuning
    - Dennis Wright
  - Maintenance and user-support
    - Dennis Wright & M. Kelsey
- Maintenance of **Binary** model
  - G. Folger
- **INCL++** model
  - Extension to strange hadrons
    - J-C. David
  - Maintenance
    - J-C. David & D. Mancusi

Precompound / De-Excitation models

- Making the new GEM model the default
  - V. Ivanchenko
- Complete the work on the emission of correlated gammas
  - J. Detwiler, V. Ivanchenko
- Inclusion of angular-momentum conservation in precompound/de-excitation models
  - J.M. Quesada Molina
- Tuning of precompound/de-excitation models
  - V. Ivanchenko & J.M. Quesada Molina
- Improve CPU and memory performance of de-excitation
  - V. Ivanchenko
- Validation
  - M. Cortes, V. Ivanchenko, M. Taylor

ParticleHP model (1/2)

- Maintenance and support of ParticleHP
  - P. Arce & T. Koi
- Validation of ParticleHP for charged particles
  - E. Mendoza & D. Cano Ott
- Treatment of the reactions: (d, p), (t, p), (t, d), (He3, p), (He3, d), (He3, t), (α, p), (α, d), (α, t), (α, He3)
  - E. Mendoza & D. Cano Ott
- Update of LEND package, T. Koi
- Update of G4LEND (LLNL low energy nuclear data interface) and GIDI (General Interaction Data Interface)
  - B. Beck, T. Koi, J. Verbeke, Douglas Wright
- Maintenance of the Fission Fragment module, B. Wendt

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

- Integration of NCrystal (model of ~meV neutron scattering in both poly- and single-crystals) in Geant4, with documentation and a few examples
  - X. Cai & T. Kittelmann

Radioactive Decay model (1/2)

- Radioactive decay improvements
  - Dennis Wright
- Extension to Super Heavy Elements (SHE)
  - L. Sarmiento
- Beta-delayed emissions of protons and neutrons
  - L. Sarmiento
- Support and validation of the new nucleon emission channels
  - T. Koi
- Maintenance of the RDM & PhotoEvaporation data-sets
  - L. Desorgher

Radioactive Decay model (2/2)

- More tests of RDM to be included in system testing
  - L. Desorgher
- RDM biasing improvements
  - A. Howard
- Other contributions : F.Lei, M.Maire, M.Taylor, M.Venhart

Other models (1/2)

- Improvement of the **photo-nuclear** model
  - Dennis Wright
- Maintenance and support of the **QMD** package
  - T. Koi
- Enhacing **muon capture** framework
  - K. Lynch & K. Genser
- Implementation of a Ion Coulomb excitation model
  - M. Taylor
- Review of hadron elastic models (in particular the diffuse model)
  - W. Pokorski
- Design interface for accessing hadronic parameters
  - T. Koi & J. Yarba

Other models (2/2)

- Convert **TARC** into *test15* to be run in nightlies
  - A. Howard
- Validation with **n_TOF**
  - M. Cortes
- Maintenance and periodic execution of *test30* and *test45*
  - A. Ivanchenko
- Validation of low-energy (< 100 MeV) hadronic models for protons and ions
  - INFN : P. Cirrone, *C. Mancini*, L. Pandola
- **Neutrino** interactions:
  - Complete the Geant4 interface to **GENIE** , D. Wright
  - R&D for neutrino-nucleus final state generator, V. Grichine
  - R&D for neutrino-nucleus integral cross section, V. Grichine

Cross Sections

- Complete test suite for hadronic cross sections (with data)
  - W. Pokorski
- Review (physics & code) of the Glauber-Gribov cross sections
  - W. Pokorski
- Review and update G4NEUTRONXS data set
  - V. Ivanchenko
- Review and update of the Barashenkov-Glauber-Gribov (BGG) cross sections
  - V. Ivanchenko
- 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)
- Muon stopping code-factorization and muonic/exotic atoms
- Maintenance, and periodic execution of Test19, Test23, Test47, Test48, Test75
- Physics highlights release page
- Validation with BNL and MIPs data
- Including the new CMS high-granularity test-beam
- Development of the infrastructure for generating MC predictions with an uncertainty band
- Development of interfaces for Geant4 hadronic models to be used by GENIE
- FNAL Team: S.Banerjee, K.Genser, R.Hatcher, H.Wenzel, J.Yarba