Hadronic Group
Work Plan for 2014

2nd version, 27 February 2014

Model development (1)

STRING MODELS

- Preparation of a short description of FTF model for publication
  - V. Uzhinsky (1)
- Improvement of diffraction dissociation in FTF model
  - V. Uzhinsky (1)
- Validation of FTF for nucleus-nucleus interactions
  - A. Galoyan, V. Uzhinsky (1)
- Validation and extension of HIJING through the G4 interface
  - Validation with high-energy p-A and A-A data
  - Supplement HIJING with Bertini or Binary cascade
  - Supplement HIJING with de-excitation codes
  - K. Abdel-Wagel (1 & 2)

Model development (2)

- Code improvement of FTF
  - A. Ribon (with advices and help by Gunter) (1 & 2)
- Study of rescattering in FTF with Bertini and Binary
  - A. Ribon (2)
- Tuning of FTF model to improve of proton spectra in proton-Nucleus and antiproton-Nucleus interactions
  - A. Galoyan (2)

- Validation and improvements of QGS
  - Extension to lower energy with Reggeon Cascade
    - V. Uzhinksy (2, *if supported by SFT*)
  - Study and validation of diffraction dissociation
    - V. Grichine (1) & V. Uzhinksy (2, *if supported by SFT*)

Model development (3)
BERTINI MODEL

- New two-body angular distributions for pi-N

  - D. Wright (1)

- Bertini parameter tuning

  - Re-evaluate overall performance (both thin and thick target) with in-medium cross-sections, improved angular distributions, and physically-motivated nuclear model parameters

  - M. Kelsey (1)

- Validate final-state nucleon clustering for light-ion production, and enable by default

  - M. Kelsey (1)

- Update and improvement of kaon physics in Bertini

  - Extend final-state tables to 32 GeV and 9-body final states

  - D. Wright (2)

Model development (4)

PRECO MODEL

- Improve design of de-excitation module to reduce memory footprint, reduce memory churn, and improve CPU

  - V. Ivanchenko (2)

Model development (5)

HP MODEL

- Improve MT-behaviour of neutronHP
  - T. Koi (1)

- Merge neutronHP with particleHP
  - T. Koi (1) with the help of CIEMAT group

- Continue the development of the Fission Fragment Generator model in neutronHP
  - B. Wendt (1 & 2)

- Add interpolation of cross sections following ENDF-6
  - P. Arce (1)

- Test particleHP for a big number of isotopes and energies
  - P. Arce (1)

Model development (6)

- Validation of new neutron cross section libraries (i.e. new releases) and new G4 releases (i.e. version 10)

- Verification that the neutron transport in neutronHP remains the same after the merging with particleHP

- Revision of the thermal transport energy processes and libraries

- Act as an interface between the Nuclear Physics community and the Geant4 collaboration
(via the EC projects ENSAR, ENSAR2 and CHANDA)

- D. Cano & E. Mendoza (1 & 2)

Model development (7)

BINARY MODEL

- Add coalescence to BIC

  - G. Folger (2)

- Improve use of static TLS in the scatterer (*im_r_matrix/*)

  - G. Folger (1)

- Investigate BIC for pi- stopping at rest and gamma-nuclear

  - W. Pokorski (2)

Model development (8)

INCL++ MODEL

- Automatic physics testing of INCL++

  - D. Mancusi (1)

- High-energy extension of INCL++ (up to 12 GeV)

  - D. Mancusi (1 & 2)

Model development (9)

RADIOACTIVE_DECAY

- Fix reproducibility problems in radioactive decay (1)

- Improve and refactor radioactive decay code (2)

- Validation tests for radioactive decay (2)

- D. Wright

Model development (10)

ELASTIC MODEL

- Development (and validation) of hadron **elastic** scattering
  - V. Grichine (1)

- Validation of hadronic models for elastic scattering of:
  - Pi-proton, Pi-Nucleus, K-proton, K-Nucleus, antiproton-proton, antiproton-Nucleus
  - A. Galoyan (1)

Model development (11)

OTHER MODELS

- Evaluate and eventually implement the **charge-exchange** process

  - V. Ivanchenko (2)

- Code improvement of Chips-extracted **quasi-elastic**

  - W. Pokorski (2)

Cross Sections

- Design and code improvements of hadronic cross sections
  - W. Pokorski (1)

- Complete test suite for hadronic cross sections (with data)
  - W. Pokorski (1)

- Validation of hadron elastic cross sections (and final-state)
  - V. Grichine (1)

Code/Design Review

- Review of the memory use in hadronic classes

  - Reduce memory footprint and churn

  - A. Dotti et al (1 & 2)

- Design improvement of hadronics

  - e.g. de-excitation model;
      using factories for hadronic models; etc...

  - The review of hadronic classes needed for G4 MT offers a good opportunity for design & code improvements in hadronics

  - Many people (1 & 2)

Validation & Testing (1)

- Update and improvements of hadronic tests and examples
  - A. Ivanchenko, M. Maire (1 & 2)
- Validation of proton elastic scattering
  - V. Grichine (1)
- Validation of neutronXS with TARC
  - A. Howard (2)

Validation & Testing (2)

- Validation framework development (1 & 2)

- Muon stopping and capture development and validation, Test48 (1 & 2)

- Maintenance, and periodic execution of Test19, Test47, Test48, Test75 (1 & 2)

- Development of Test23 (1 & 2)

- Physics highlights release page (1 & 2)

- FNAL Team: D. Elvira, K. Genser, H. Wenzel, J. Yarba