Hadronic Group Work Plan 2011
Main Areas of Focus

• Model development

• Validation

• Cross sections
Model Development (1)

- String models (Vladimir Uzhinsky)
  - implementation of anti-baryon-nucleus and anti-ion-nucleus interactions in FTF (June 2011)
  - tuning and validation of annihilation in FTF (September 2011)
  - addition of Reggeon cascade to QGS (2012)
  - improved small-mass string fragmentation in QGS (2012)
Model Development (2)

• Bertini cascade (Mike Kelsey, Dennis Wright)
  – Implementation of Propagate() method for use with FTF (June 2011)
  – addition of coalescence model in cascade stage of Bertini (September 2011)
    • possibly also in precompound stage
  – implement trailing effect (June 2011)
  – develop a better model for nuclear recoil (December 2011)
  – addition of anti-baryon-nucleus and anti-ion-nucleus interactions (2012)
Model Development (3)

• INCL/ABLA (Pekka Kaitaniemi)
  – add new model (INCL++) (September 2011)
  – Develop de-excitation handler interfaces for INCL models (December 2011)

• Radioactive decay (D. Wright, M. Maire, L. Pandola, L. DeSorgher, V. Ivantchenko)
  – update Geant4 version of ENDSF to 2011 (September 2011)
  – add validation tests (December 2011)
  – improve photo-evaporation code (2012)
  – improved handling of meta-stable states (2012)
Model Development (4)

• Neutrons
  – complete interface to ENDL database (T. Koi, B. Beck) (May 2011)
  – install alternate G4NDL implementation (T. Koi, D. Cano-Ott, J.-M. Quesada) (May 2011)

• Ions (T. Koi)
  – extend energy reach of G4QMD (December 2011)
Model Development (5)

- De-excitation (V. Ivantchenko)
  - finish clean-up of multi-fragmentation and GEM codes (June 2011)
- Coalescence model for precompound/evaporation stages (V. Ivantchenko) (December 2011)
- Study CHIPS for code speed-up (Fred Jones)
- CHIPS re-organization (D. Wright, G. Folger)
- Refactoring based on architecture review (depending on review time-scale)
  - all model maintainers
Validation (1)

• Continue to populate new validation and test facility
  – H. Wenzel, J. Yarba, D. Elvira (December 2011)
• Complete validation suites in all energy ranges
  – high energy
    • G. Folger (December 2011)
  – stopping particles
    • F. Jones, J. Yarba (December 2011)
  – ion-ion
    • T. Koi (December 2011)
Validation (2)

• Shower shapes (A. Dotti, J. Apostolakis)
  – compare to HELIOS, (NA62) data (May 2011)
  – develop more detailed tests of shower shape composition, with new observables (April 2011)

• Transition region (A. Dotti, J. Apostolakis)
  – study effect on energy resolution (June 2011)

• G4Precompound/evaporation (A. Ivantchenko, V. Ivantchenko, J.M. Quesada, M. Kelsey, J. Yarba, A. Howard)
  – detailed comparison of Bertini cascade with and without G4Precompound (June 2011)
  – continued validation and performance improvement
Validation (3)

• Continuing, regular validation effort
  – IAEA, test30, test35
    • V. Ivantchenko, A. Ivantchenko

• Energy/momentum conservation in models and physics lists (J. Apostolakis, D. Wright, G. Folger) (April 2011)

• Complete SAID cross section work and web pages (F. Jones) (June 2011)

• Cross section validation tests (A. Ivantchenko) (June 2011)
Validation (4)

• Comparison of ion-ion models against Catania 62AMeV data from carbon atoms on various targets (P. Cirrone, F. Romano) (December 2011)
Cross Sections

• Completion of hadronic cross section re-design (G. Folger, V. Ivantchenko, D. Wright) *(December 2011)*

• Completion of cross section, model and process documentation for physics lists (all) *(June 2011)*

• LHCb request for accurate cross sections and multiplicities
  – Kaons *(June 2011)*
  – p/pbar, Λ/Λbar *(May 2011)*