

Summary of Changes Implemented for Isotope-dependent Cross Sections

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G4VCrossSectionDataSet

- Original version had only:
 - `GetCrossSection(G4DynamicParticle*, G4Element*, temperature)`
- Added two virtual methods:
 - `GetIsoCrossSection(G4DynamicParticle*, G4Isotope*, temperature)`
 - `GetIsoZACrossSection(G4DynamicParticle*, Z, A, temperature)`
- Any cross section class deriving from this class will get isotope functionality
 - above two methods must be implemented for each derived class
 - this was done for most cross section sets
 - derived cross section class must also provide A and temperature dependence, otherwise defaults to A- and temperature- independence

G4CrossSectionDataStore

- Added four methods:
 - GetCrossSection(G4DynamicParticle*, G4Isotope*, temperature)
 - GetCrossSection(G4DynamicParticle*, Z, A, temperature)
 - GetCrossSection(G4DynamicParticle*, G4Material*)
 - replaces GetMicroscopicCrossSection in G4HadronicProcess
 - SelectRandomIsotope(G4DynamicParticle*, G4Material*)
 - chooses isotope from defined material
 - uses A-dependent cross sections if defined, otherwise defaults to A-independent
 - can use either user-defined or natural isotopic abundances (nIsoPerElement in G4Element)
 - temperature interface is implemented, but not currently used

G4HadronicProcess

- Re-implement methods GetMeanFreePath and ChooseAandZ
 - GetMeanFreePath uses
`G4CrossSectionDataStore::GetCrossSection(G4DynamicParticle*, G4Material*)`
 - ChooseAandZ uses
`G4CrossSectionDataStore::SelectRandomIsotope(G4DynamicParticle*, G4Material*)`
- G4HadronicProcess no longer has its own cross section methods
 - GetMicroscopicCrossSection method still there for backward compatibility (remove in future versions?)
 - G4CrossSectionDataStore instantiated instead