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# PLANS FOR 2009 AND MILESTONES FOR 2010-2012

## PLANS FOR 2009

### 1. **Software design** (June 2009) (+Std EM)

- finish testing of migrated Livermore photon processes
- finish testing of migrated Geant4-DNA processes
- migration of Livermore electron processes (ionisation, bremsstrahlung)

### 2. **Software computing performance** (June 2009)

- Performance improvement of log-log interpolation methods used for low-EM Geant4 processes
  - ◆ new EM datasets containing additional data columns (logarithmic values of existing data)
  - ◆ new methods for loading the additional information of the new EM datasets for each process performing a log-log interpolation
  - ◆ revised Calculate method of LogLogInterpolation class to take into account the additional information and speed-up the execution
  - ◆ old and new log-log interpolation methods will remain both active and compatible with all low-EM processes
  - ◆ exclusive use of new implementation for most low-EM G4 processes
- Regular profiling studies (every 6 months) of the computing performance of the G4EMLowEnergy library
  - ◆ Identify newly emerged bottlenecks and schedule necessary actions for their elimination
- Construction of a graph illustrating the call-relationship (execution flow) between the frequently-called classes of the G4EMLowEnergy library

### 3. **Systematic testing** (June 2009) (+Std EM)

- extend coverage (particles, energies, materials) of automated tests

### 4. **Build a reference data base for verification & validation** (December 2009) (+Std EM)

- theoretical predictions
- experimental data
- other Monte Carlo codes : EGSnrc (photons), MCNPX (protons), FLUKA (Bragg peak), Penelope (Compton profiles)
- quantification of comparison results with statistical toolkit

### 5. **Debugging of processes** (December 2009) – *MANPOWER NEEDED*

- G4LowEnergyIonisation
- G4hLowEnergyIonisation
- long dating bugs

### 6. **New Physics models with Std EM design** (December 2009) (+Std EM)

- improvement of Penelope models
- polarized photoelectric and gamma conversion, triple conversion models (gamma -> e+ e- e-)

### 7. **Documentation** (December 2009) (+Std EM)

- common EM web pages

## MILESTONES FOR 2010-2012

### 8. Physics (+Std EM)

- Std EM interface extension for fluorescence/PIXE/Auger emission in order to let users register additional models in different energy windows

### 9. Software design (+Std EM)

- Redesign full data handling

### 10. Geant4-DNA (+Std EM)

- new Physics models in liquid water / other biological materials
- physico-chemistry processes implementation
- molecular geometries (DNA)
- biological damage quantification
- other applications : material sciences, injectors

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Main Low Energy WG page

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