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New Geant4 physics processes for simulation at the electronvolt scale

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The extension of Geant4 simulation capabilities down to the electronvolt scale is required for precision studies of radiation effects on electronics and detector components, and for micro-/nano-dosimetry studies in various experimental environments.
A project is in progress to extend the coverage of Geant4 physics to this energy range. The complexity of the problem domain is discussed - such as, for instance, the fact that in this energy range process models are material-dependent. The physics models of new processes implemented in the Geant4 Toolkit are presented: elastic scattering, charge increase/decrease, excitation, ionisation. A new approach to policy-based process design in Geant4 is described. Results concerning various processes at the electronvolt scale are presented.

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