

GEANT4

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The GEANT4 code system is a simulation tool-kit for propagation of particles in matter. It is a complete system in so far, as it includes components for tracking, geometrical modelling, event and run framework, visualization, event biasing, hits, etc.

The physics processes offered aim to be comprehensive - including electromagnetic, hadronic, and optical processes - for a large set of long-lived particles in all materials and elements. The energy range of applicability it starting, in some cases, from 10^{-5}eV and extending in others to the 100 TeV energy range and above.

GEANT4 has been designed as a component system, and constructed to allow to tailor and expose the physics models utilized, to handle complex geometries, and to enable its easy adaptation for optimal use in different areas of application. This component system is the result of the work of a worldwide collaboration of physicists and software engineering experts. It has been created exploiting international software engineering standards and object-oriented technology, and is implemented in the C++ programming language.

In the present paper, we will, after giving a brief overview of the history of the collaboration, focus on the physics capabilities of the system. Geant4 has been used in applications in particle physics, nuclear physics, accelerator design, space engineering and medical physics, and others, and we will illustrate its use and impact on selected examples.