

Hadronic aspects in Geant4

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Abstract: Hadronic physics in Geant4 spans the full energy range of interest and covers any reaction which can produce hadrons in its final state. As such, it covers purely hadronic interactions, lepton- and gamma-induced nuclear reactions, and radioactive decay. The interaction is represented as a Geant4 process which consists of a cross section to determine when the interaction will occur, and a model which determines the final state, i.e. produced secondary particles, of the interaction. Models and cross sections are provided over the full energy range. As a characteristic Geant4 feature, for a given process within a certain energy range, more than one cross section and model are usually offered in order to provide alternative approaches for different applications. Therefore several options exist which can be combined at user's choice or packed in a physics list. This presentation concentrates on particles, cross sections and models relevant for medical applications whose energy region of interest lies below 1 GeV. The main aspects and performance of the hadronic physics of Geant4 are included in the latest general review [1] and in a comprehensive benchmark for medical applications [2].

[1] J. Allison et al., Nucl. Instrum. Methods Phys. Res. A, vol. 835 (2016) 186–225.

[2] P. Arce et al., Med. Phys., vol. 1, no. 48 (2021) 19–56.