

Validation and development of the G4SEE radiation effect simulation toolkit

čtvrtek 9. listopadu 2023 14:15 (15 minut)

G4SEE –Geant4 based Single Event Effect (SEE) simulation toolkit - is being developed at CERN within the Radiation to Electronics (R2E) activity for the whole radiation effects community for a wide range of practical applications. The G4SEE toolkit is a free and open-source code available for all the users. This talk will present the toolkit and mainly its newly implemented features, which are: (a) Dose scoring –it computes the dose for a number of primary particles, enabling the user to score either the Total Dose, or discriminate between Total Non-Ionizing Dose (TNID) and Total Ionizing Dose (TID), (b) Linear Energy Transfer (LET) scoring –for which three different options were implemented based on the function from which the LET is computed and the point (G4Step vs. G4Event) of the simulation run at which the LET is computed, and (c) Energy deposition scoring of different nuclear reactions –this scoring enables to see which interactions are being created during the simulation run and therefore helps the user with better understanding of individual particle (species and energy) contribution. These features were implemented in past year and will be part of upcoming G4SEE v6.0 release.

Simultaneously, validation efforts with experimental data for the toolkit are carried out, for which dedicated Monte Carlo simulations are being performed. In particular, the toolkit has been validated experimentally by measurements of inelastic energy deposition events of monoenergetic neutrons below 20 MeV. In this talk simulations of diamond detector irradiated with 14.04 MeV and 2.5 MeV neutrons and simulations of SONY CMOS image sensor irradiated with 190 MeV protons will be presented. Simulations of diamond detector has been compared with experimental data measured at PTB and also with results of FLUKA simulations. Simulations for the CMOS image sensor are currently ongoing, performed for the purpose of a proton test campaign which will happen in following year.

Přihlásit do soutěže

Přihlašuji příspěvek do soutěže o nejlepší přednášku

Hlavní autor: FIALOVÁ, Eva (Fakulta jaderná a fyzikálně inženýrská, České vysoké učení technické v Praze)

Spoluautor: LUCSÁNYI, Dávid (CERN)

Přednášející: FIALOVÁ, Eva (Fakulta jaderná a fyzikálně inženýrská, České vysoké učení technické v Praze)

Zařazení sekce: Metrologie, měření, přístrojová technika a její aplikace

Tematická klasifikace: Metrologie, měření, přístrojová technika a její aplikace