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Update On the Status of the FLUKA Monte Carlo Transport Code

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The FLUKA Monte Carlo transport code is a well-known simulation tool in High Energy Physics. FLUKA is a dynamic tool in the sense that it is being continually updated and improved by the authors. We review the progress achieved since the last CHEP Conference on the physics models, and some recent applications. From the point of view of hadronic physics, most of the effort is still in the field of nucleus–nucleus interactions with special emphasis on energies near threshold below 100 MeV/A. The currently available version of FLUKA already includes the internal capability to simulate inelastic nuclear interactions beginning with lab kinetic energies of 100 MeV/A up the highest accessible energies by means of the DPMJET-3 event generator to handle the interactions for >5 GeV/A and RQMD for energies below that down to ˜100 MeV/A. The new developments concern, at high energy, the embedding of the DPMJET-III generator, which represent a major change with respect to the DPMJET-II structure. This will also allow the code to achieve a better consistency between the nucleus-nucleus section with the original FLUKA model for hadron-nucleus collisions. Work is also in progress to implement a third event generator model based on the Master Boltzmann Equation approach, in order to extend the energy capability from 100 MeV/A down to the threshold for these reactions. In addition to these extended physics capabilities, structural changes to the programs input and scoring capabilities are continually being upgraded. In particular we want to mention the upgrades in the geometry packages, now capable to reaching higher levels of abstraction. Work is also proceeding to provide direct import into ROOT of the FLUKA output files for analysis and to deploy a user-friendly GUI input interface. On the application front, FLUKA has been used to extensively evaluate the potential space radiation effects on astronauts for future deep space missions as well as being adapted for use in the simulation of events in the ALICE detector at the LHC.

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