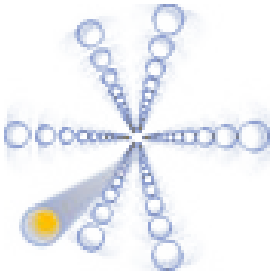

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Recent Advances in the FLUKA Event Generator for Crystal Channeling

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Channeling in bent crystals is more and more frequently considered as an option for collimating high-energy beams. The installation of crystals in the LHC, having taken place during this past year, aims at demonstrating the feasibility of multi-stage crystal-assisted collimation and possibly improving cleaning efficiency [1]. Energy deposition studies in the LHC are routinely performed with the Monte Carlo transport code FLUKA [2,3], which allows to assess the beam loss impact on collimators and magnets as well as to calculate monitor signals. A new model of crystal channeling has been developed specifically for integration into FLUKA, aiming to extend these studies to the case of crystal-assisted collimation [4].

The event generator is tailored to work in conjunction with FLUKA's interaction models and transport capabilities, in any given geometry. It is capable of handling any positively charged particles, reproducing all coherent effects in crystals with possible miscut angle or torsion. In this paper, latest developments having been brought to the model are discussed. The distribution of deflection angles for non-channeled particles incoming at small incoming angles has been improved and reproduces more accurately experimental results. Other advances are related to the adaptation of FLUKA models of nuclear and Coulombian interaction to channeled particles. Obtained interaction rates are smaller than in amorphous mode, reflecting the oscillatory nature of the channeled particles trajectory, implying in most cases larger impact parameters to the atomic lattice. Benchmarking of the simulation tool has been conducted against data from the UA9-H8 experiment at CERN.

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