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Python FLUKA beam line, a python library to create FLUKA simulations of accelerators

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FLUKA simulations of beamlines are important for un- derstanding numerous different aspects of accelerators, in- cluding beam losses, particle backgrounds, activation and shielding. Creating a beam-line simulation using FLUKA is a time consuming and potentially error prone process. This paper describes a set of python tools called pyflubl (Python FLUKA beam-line) which can create a FLUKA simulation using input from MAD-X, MAD8, Transport or BDSIM. pyflubl is based on multiple stable and advanced python packages created to make BDSIM (Geant4) beamline simu- lations as simple as possible, these are pymadx (an interface to MAD-X output), pymad8 (an interface to MAD8 out- put), pybdsim (interface to BDSIM) and most importantly pyg4ometry (a geometry engine for Monte Carlo geometry creation). The magnetic fields required for FLUKA are im- plemented in C++ via BDSIM, thus keeping fields consistent between Geant4 and FLUKA beamline simulations. This paper describes pyflubl design and implementation and ex- ample results for an idealised electron beam-line. Particular attention is given to geometry, fields and scoring.

Footnotes

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Author: BOOGERT, Stewart (Cockcroft Institute)

Co-author: NEVAY, Laurence (European Organization for Nuclear Research)

Presenter: BOOGERT, Stewart (Cockcroft Institute)

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