



Contribution ID: 78

Type: oral

Recent developments of the FLUKA Channeling model and benchmarking of SPS and LHC crystal-related activities

Monday, 5 June 2023 10:30 (20 minutes)

In recent years, bent crystals have become a mature technology now exploited in several applications at CERN, such as shadowing techniques to reduce particle losses during slow extraction from the SPS as well as crystal-assisted collimation for LHC ion runs. Looking forward, they are also a key component of future plans to measure the electric and magnetic dipole moments of short-lived particles, in a double-crystal experiment in the LHC.

This increasing prevalence of bent crystals use in accelerators has driven the development of the FLUKA model of crystal channeling, presented in 2014[1]. The model is now fully incorporated in the main software and allows users to perform multiturn transport simulations in complex crystal-based geometries, with the help of independently developed tools (FLUKA-Sixtrack coupling, LineBuilder)[2,3]. This integration effort has been complemented by the refinement of several of the model components. In particular we will explore the novel analytical microscopic tracking in quasi-channeling enabling a more precise reproduction of the interaction suppression in that regime.

Finally, we give a detailed overview of experimental results obtained in the LHC and SPS, and their comparison with results of performed simulations.

[1]: P. Schoofs, F. Cerutti, A. Ferrari, G. Smirnov, "Monte Carlo modeling of crystal channeling at high energies", Nucl. Instrum. Methods Phys. Res., B 309, 115-119 (2013).

[2]: E. Skordis, A. Mereghetti, V. Vlachoudis, et al, "FLUKA coupling to Sixtrack", CERN Yellow Rep. Conf. Proc., 2 – 17-25 (2020)

[3]: A. Mereghetti, V. Boccone, F. Cerutti, R. Versaci, V. Vlachoudis, "The FLUKA LineBuilder and Element DataBase: Tools for Building Complex Models of Accelerator Beam Lines", Proc. IPAC 2012, New Orleans, 2687-2689

Primary author: SCHOOFS, Philippe

Co-authors: Dr SALVAT PUJOL, Francesc; Dr VELOTTI, Francesco; ESPOSITO, Luigi Salvatore

Presenter: SCHOOFS, Philippe

Session Classification: S1: Beams Interactions