

# Simulation of the FCC-hh double crystal-based collimation system

*Wednesday, 31 May 2017 11:00 (10 minutes)*

“The FCC-hh collimation system must be designed to prevent quench of superconducting magnets. However, preliminary simulations [1] demonstrate the estimated cleaning inefficiency to be 2 orders less than required. In order to considerably reduce it, we propose a preliminary setup of a double crystal-based collimation system [2].

The main advantage of the double crystal-based collimation, containing two bent crystals instead of one, is additional halo cleaning by deflection of dechanneled/volume reflected particles by the second crystal. On the one hand this allows one to intercept almost 100% of halo particles by only one passage of the collimation zone, considerably reducing inelastic losses in crystal as well as leakage in absorbers. On the other hand the second crystal does not prevent particle interception by the first one, being placed closer to an absorber in the transverse space.

We simulate the collimation system suggested using CRYSTAL software [3] as well as compare its efficiency with single crystal-based collimation. We optimize the crystal parameters to maximize the collimation efficiency.

We acknowledge the CINECA award under the ISCRA initiative for the availability of high performance computing resources and support.

1. J. Molson et al. Proc. of IPAC'16, Busan, Korea (2016) p. 1381-1383.
2. A. Lobko, V. Tikhomirov, A. Sytov. Abstr. of the FCC Week 2016, contribution ID: 125.
3. A. I. Sytov, V. V. Tikhomirov, Nucl. Instr. and Meth. in Phys. Res. B 355 (2015) 383–386.”

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**Session Classification:** FCC-hh machine design