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## **Monte Carlo Studies into energy deposition and beam collimation**

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At the Large Hadron Collider (LHC), proton beam losses must be controlled to unprecedented levels of accuracy as there are about 9 orders of magnitudes between the beam stored energy and the quench limits of superconducting magnets. This poses critical challenges for the simulations of collimation performance that must provide accurate estimates with appropriate statistics of beam losses at the level of  $1e-5$  of the primary beam halo. A review of the available tools for collimation simulations, based on state-of-the-art particle tracking and energy deposition simulations, is presented. The comparison with the experimental data accumulated during the LHC run1 at 3.5 TeV and 4 TeV is also discussed and future challenges of novel collimation concepts are outlined.

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