

SppC collimation study

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In LHC, the limiting locations in terms of losses on cold magnets are the dispersion suppressors downstream of the transverse collimation insertion. These losses are due to the protons experiencing single diffractive interactions in the primary collimators. How to solve this problem is very important for future proton-proton collider, such as FCC and SPPC. An effective method which arranges both the transverse and momentum collimation in the same cleaning insertion has been studied at SPPC. The momentum collimation system will clean those particles those protons related to the single diffractive effect. This has been confirmed by multi-particle simulations. In addition, superconducting quadrupoles with special designs such as enlarged aperture and good shielding are being considered to enhance the phase advance in the transverse collimation section, so that tertiary collimators can be arranged to clean off the tertiary halo which emerges from the secondary collimators and improve the collimation efficiency. Multi-particle simulation results with the Merlin code confirm the effectiveness of the method with the additional collimation stage. The particle losses in the warm drifts and the beginning of the momentum collimation insertion are reduced significantly.

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