

First considerations of the layout and lattice design of SPPC

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For precision measurement of Higgs boson and searching for evidences of new physics beyond the Standard Model, China proposed a strategy of CEPC-SPPC, which plans to build a pp collider (SPPC) after the phase of ee Higgs factory (CEPC). In November 2016, CEPC-SPPC Steering Committee decided to adopt the baseline design of 100 km tunnel. This paper will present the progress of lattice design of SPPC. The lattice design is mainly constrained by tunnel layout, maximum dipole strength, C.O.M energy, beam optics and so on. The following problems have been considered carefully in our study. Firstly, constrained by the tunnel length of 100 km and maximum dipole strength of 16 T, lattice design with large dipole filling factor may reduce the difficulty in obtaining C.O.M energy of 100 TeV; secondary, the maximum strength of quadrupole and the value of beam optics in arcs should be acceptable; thirdly, considering the compatibility problem between CEPC and SPPC tunnel, the lattice design should have the ability of adjusting the layout slightly in the future. This Paper presents our first considerations of the layout and beam optics of SPPC based on the new baseline of 100 km tunnel - 16 T dipoles - 100 TeV C.O.M energy, including the designs of arc structure, dispersion suppressor, and high - luminosity insertion. Dynamics aperture have been estimated by using SixTrack based on the first version of lattice of SPPC, and the preliminary result of dynamics aperture will be presented in this paper too.

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