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Nonlinearity optimization for the 125 TeV SPPC collider ring lattice

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As an energy frontier machine, the proposed Super Proton-Proton Collider (SPPC) will have the capability to explore a much larger region of new physics models with center of energy around 125 TeV and circumference 100 km.
The nonlinearity optimization of the SPPC collider ring lattice is essential to get a high peak luminosity and lifetime of the beams. In this paper, a collider ring lattice based on the CDR one will be presented. Then, the nonlinearity of the bare lattice was optimized using Lie map analysis and frequency map analysis. With the optimization, the lattice aberration at the interaction points and dynamic aperture of whole ring were improved.
Finally, the alignment tolerances and field error tolerances for the SPPC are evaluated. The correction scheme of the lattice with errors will be presented.

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Footnotes

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Yes

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