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Compact common-coil design for a future collider

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"High field accelerator dipoles are the enabling technology for future colliders surpassing the energy reach of LHC.
The effectiveness of adopting a common-coil layout, featuring flat racetrack coils shared between the two magnetic apertures, is investigated here. The common coil layout offers potential advantages such as use of flat cables and larger bending radius at the coil ends. However, the vertical arrangement of the two apertures is less efficient than the traditional case with the two apertures placed side by side, from both the magnetic and mechanical standpoint.
In this study we attempt to address these challenges and provide an attractive and compact common coil design in the field and aperture range of interest. Key performance parameters such as maximum field as a function of superconductor volume and overall magnet size, field quality, mechanical support, and quench protection in the accelerator, will be discussed.

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