

Abstract Submitted
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Demountable, High field High-Temperature Superconductor TF coils for flexible steady-state fusion experiments¹ PHILLIP MICHAEL, LESLIE BROMBERG, RUI VIEIRA, JOSEPH MINERVINI, CHRISTOPHER GALEA, SARAH HENSLEY, DENNIS WHYTE, MIT — The excellent properties of HTS materials (e.g., YBCO) at high fields and elevated temperatures (>20 K), offer operational advantages for fusion machines, but results in challenges. For fusion devices, the ability to disassemble the TF coil is very attractive as it provides direct access to maintain the vacuum vessel, first wall and other components in a timely manner. High current conductors, made from multiple thin tapes, are not available but are being developed. Quench protection is a serious issue with HTS magnets, and novel means are needed to detect normal zones and to quickly discharge the magnet. Potential cables designs, demountable magnets and solutions to quench and protection issues for an HTS TF magnet for the Vulcan device (long term PMI studies) will be described. We also describe means for making continuous, persistent loops with HTS tapes. These loops offer an alternative to expensive monoliths for field control for complex geometries, such as stellarator-like fields.

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Abhay Ram
MIT

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