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Parametric Study of HTS Coil Quench Protection Strategies¹ JOSEPH SEIBERT, Bowdoin College, MICHAEL ZARNSTORFF, YUHU ZHAI, Princeton Plasma Physics Laboratory — Next generation fusion devices require high magnetic fields to adequately contain burning plasmas. Use of high temperature superconducting (HTS) coils to generate these magnetic fields would lower energy cost of operation as well as increase stability of the superconducting state compared to low temperature superconducting coils. However, use of HTS coils requires developing quench protection strategies to prevent damage to the coils. One technique involves the utilization of copper discs and other conductors mutually coupled to the HTS coil to quickly extract the current from the coil. Another technique allows conduction between HTS turns to reduce the current in the coil during quench. This project describes a parametric study of the HTS coil and resistive-conductor setup in order to determine limiting cases of the geometry in an attempt to optimize current extraction and coil protection during quench scenarios.

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