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## **Metal as insulation winding high-temperature superconducting split pair coil to improve the protection against quenches**

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High-temperature superconducting split pair magnet for neutron scattering environment with the metal-as-insulation (MI) winding technique enables mechanical strength with quench risk reduction. Quench protection is crucial for superconducting magnet system's reliable and safe operation. High-temperature superconductors enable a rapid rise to the maximum magnetic field, compressed dimensions, and are cooled by dry cryostat. However, the risk of quenching, the sudden drop in the magnetic field or thermal runaway is still a unsolved problem. A new demonstrator of metal-insulated HTS cable is used to study the quenching mechanism for quench protection. This process maps out into three phases, Simulations, constructing a demonstrator, and analyzing; we addressed the first phase with research and development planning using the finite element method COMSOL to simulate the upcoming HTS with metal insulated technology. For quench protection of high-temperature superconducting (HTS) magnets, we have chosen the metal-as-insulation (MI) winding technique by co-winding the bare HTS tape with a metal ribbon which has high electric resistivity and mechanical strength.

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