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Protection of LTS and HTS magnets and circuits for FCC-hh

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This presentation introduces the concepts of magnet and circuit protection of the FCC-hh, focusing on the main dipole magnets. For the baseline case of 14 T Nb3Sn magnets, magnet protection is preferably provided by ESC, and eventually quench heaters to cover the low current regime, combined with cold by-pass diodes. For the case of 14-20 T HTS magnets, a similar protection strategy is feasible, although more challenging. An alternative approach based on a 'no-quench' concept is also proposed. The advantages, disadvantages and limitations of the latter are presented.
Irrespective of the type of magnets, circuit protection is provided by energy extraction. Multiple circuits per arc are envisaged, with power converters and energy extraction systems located at the 8 access points, and an additional cryogenic distribution line to house the superconducting links feeding these circuits.

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