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## Quench Protection of the 11 T Nb<sub>3</sub>Sn Dipole for the High Luminosity LHC

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The planned upgrade of the LHC collimation system requires the installation of 11 T Nb<sub>3</sub>Sn dipole magnets. Due to the large stored energy density and the low copper stabilizer section, the quench protection of these magnets is particularly challenging. A total of ten coils assembled in five single aperture and two double aperture short model magnets have been tested at CERN with different heater to coil insulation lay outs. This paper reports on the test results of the model program, which are used to validate numerical models and to optimize the quench protection performance. A parametric analysis on the impact of different conductor and operation parameters on the peak temperature is presented. Coil voltage to ground and turn to turn voltages are also evaluated under nominal conditions and failure case scenarios.

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