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Measured Strain of a Nb₃Sn Coil During Excitation and Quench

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The stress in a high field Nb₃Sn coil was measured during magnet assembly, cool-down and excitation. The coil strain was obtained with a full strain-gauge bridge mounted directly over the turns and impregnated with the coil. Two such coils were placed in a “common coil” fashion capable of reaching 10T at 4.2K. The measured steady state stress in the coil is compared with similar results obtained using the FEM code ANSYS. During quenches, the transient stress (due to a temperature rise) was also measured and compared with the calculated mechanical time response to a quench.

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