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Friction-coefficient between the Ti6Al4V loading pole and the 316LN steel shims of the HL-LHC 11 T magnets

Wednesday 30 August 2017 13:15 (1h 45m)

As part of the Large Hadron Collider High Luminosity upgrade (HL-LHC) project, 11 tesla Nb3Sn dipole magnets will replace some of the existing 8.33 T Nb-Ti LHC main dipole magnets. The 11 T dipole coils are mechanically loaded through a removable pole wedge. The force exerted on the Ti6Al4V pole wedge is transmitted onto the coils via tangential sliding of the wedge on the coil shims and loading plates. We have measured friction coefficients of Ti6Al4V sliding on 316 LN under a pressure of 100 MPa and 200 MPa in ambient air and in liquid helium at 4.2 K, and we discuss the effect of the friction behavior on magnet training and performance. Potential benefits of solid lubricant coatings are discussed as well.

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