Contribution ID: **354** Contribution code: **TUE-PO1-715-06** Type: **Poster**

Numerical Modelling of the Interfacial Debonding in Superconducting Magnets

Tuesday, 16 November 2021 13:15 (20 minutes)

Stress managed magnet designs are being developed to limit the strain and stresses applied to the conductor during powering. The canted cos θ (CCT) design is one of the proposed solutions. In this design, the conductor is wound around a mandrel: the impregnation process creates a bonding between the two, that can fail when the magnet is powered. The energy releases consequent to the debonding are a potential cause of training quenches. In this study, we model the mandrel-conductor interfaces using cohesive zone material models. The material properties were calibrated by means of measurements, performed on representative interfaces. The models were used to investigate the interfacial failure during the magnet life of CCT magnets built for the Magnet Development Program. The model results were then used to predict potential quenches and investigate the effect of structural modifications on magnet performances.

This work was supported by the U.S. Department of Energy, Office of Science, Office of High Energy Physics, through the US Magnet Development Program.

Primary authors: VALLONE, Giorgio (Lawrence Berkeley National Lab. (US)); ANDERSSEN, Eric (Lawrence Berkeley National Lab (US)); ARBELAEZ, Diego; BROUWER, Lucas (Lawrence Berkeley National Laboratory); FERRACIN, Paolo; PRESTEMON, Soren

Presenter: VALLONE, Giorgio (Lawrence Berkeley National Lab. (US))

Session Classification: TUE-PO1-715 Mechanical Behavior of Coil I