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M1Or3C-03 [Invited]: Tough Epoxy Systems for the Impregnation of (Future) High Field Superconducting Magnets

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The Future Circular Collider Study (FCC, hosted by CERN) explores possible designs for circular colliders addressing the post-LHC era. To reach higher energies which is fundamental for studying up-to-now unexplained phenomena, the development of new technologies, i.e. new coil concepts, providing magnetic fields up to 16 T, is desirable. A crucial aspect in this area of research addresses the necessary improvements with respect to the resin impregnation systems, with the goal to overcome field limiting effects occurring during training like micro-cracks, plastic events, or delamination. A current cooperation between ETH Zürich, Paul Scherrer Institute and CERN, embedded in the CHART (Swiss Accelerator Research and Technology) initiative , aims at the development of tough epoxy systems suited for the impregnation of future high field superconducting magnets. In the first project period, - running since May 2018 –a baseline is established by the characterization of three technically relevant systems that are compared with regards to their mechanical and processing properties at room temperature and liquid-nitrogen temperatures. An overview about the project itself as well as its latest status concerning the compression, tensile, three-point bending, fracture toughness, viscosity and calorimetric measurements will be given and put up for discussion.

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