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Mon-Mo-Or2-03: Critical Current and Quench Characteristics of a ReBCO 2G Roebel Cable Pancake Coil at Different Temperatures between 4.2K and 77K in an External Field up to 10T

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A pancake coil was prepared with a length of 15-strand ReBCO 2G Roebel cable and studied in detail at different operating temperatures between 4.2K and 77K, cooled with either liquid cryogenics or flowing liquid helium gas. The coil was impregnated with epoxy and the transient cooling was predominantly by conduction from current contacts. Critical current measurements were carried out with a transport current up to 1kA in an external axial field up to 10T. Quench measurements were carried out following point-like disturbances initiated by a localised miniature heater embedded inside the coil. The different heat dissipation at the current contacts were dynamically compensated with collocated auxiliary heaters to ensure the isothermal condition of the coil for the successive quench episodes. Minimum quench energy (MQE) were obtained at different temperatures, fields and current load relative to the critical current. The present work is a substantive follow up of previous studies at 77K in liquid nitrogen where it has been established that the coil retained the critical current of the superconducting strand/cable and its quench behaviour was unaffected by the lateral cooling by the cryogen.

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