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M2Po3C-04: Characterization of NbTi wires for the electron-ion collider project

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The Electron-Ion Collider (EIC) is a proposed machine to explore the behavior of the fundamental particles and forces that bind atomic nuclei together. The design and construction of the EIC are underway at Brookhaven National Laboratory (BNL) in collaboration with Thomas Jefferson National Accelerator Facility. EIC will use several different types of superconducting strands for magnets near the interaction region (IR) of EIC. At beam injection, the magnetic field is usually very low compared with its maximum operating field. This usually created considerable field errors mainly generated from persistent current in superconducting strands even using very fine filament. The accurate magnetization measurement results from those superconducting strands will be critical for the calculation and future correction of persistent current for EIC.
In this work, we characterized 5 types of NbTi strands. The magnetization was measured at 4.2 K and 1.9 K. The critical current at 4.2 K and in magnetic field down to 4 T were also measured. Other properties that are important for the safety margin of superconducting magnet fabrication, operation, and quench protection such as residual-resistance-ratio (RRR), filament diameter, Cu to non-Cu ratio, twist pitch, and mechanical properties will also be presented.

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