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Wed-Af-Po3.17-07 [35]: High definition 3D finite element analysis of low temperature Rutherford cable

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A multi-scale mechanical model of Rutherford type, low temperature superconducting cable is discussed in this paper.
The homogenization of the mechanical properties of the superconducting bundle is explained, at room and cryogenic temperature. The inclusion of a high definition three-dimensional sub-modelling of the strand geometry is illustrated, up to the superconducting filaments scale. The geometrical reconstruction of impregnated stacks is presented using a simplified bi-metallic description.
This finite element model is confronted with experimental results performed on stacks of conductors, with a view in estimating the cable current transport capability thanks to existing scaling laws.

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