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Wed-Af-Po.03-02: Modular retaining structures for the REBCO racetrack coil development at CERN

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A R&D program for the development of HTS magnets is ongoing at CERN. Double pancake coils are manufactured using a polyimide insulated cable made of an assembly of REBCO and copper tapes. The coils are then assembled in groups inside a structure optimized to contain the electromagnetic forces and limit the cable deformations (and consequent stresses).

It is foreseen to have a step-by-step approach. The program begins with the fabrication of short windings, approximately 250-mm in length, using 4-mm wide HTS tapes. In a first phase, the aim is to reach fields between 5 T and 9 T at 4.2 K by using groups of coils arranged in a common coil configuration or piled up in stacks. Then, in a second phase, the coil size and the field level will increase profiting of the acquired experience and know how. The final goal of the program is to reach fields of the order of 20 T in double aperture, 50-mm bore dipoles, with coils approximately one meter long.

In this note, we describe the configuration of the coils and the containment structures that are used in the first phase. The approach is modular; meaning that the transition from the first phase to the second, at higher fields, will be realized by a gradual increase of the key geometrical dimensions without changing the validated functional principles.

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