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M1Or2A-03: Tube type strands with and without artificial pinning centers in Hyper Tech

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Hyper Tech has developed the tube type strands with and without artificial pinning center (APC). For the regular tube type strands, our standard conductor with 217 filament arrays have been generated with 12 T non-Cu Jc values of about 2400-2500 A/mm² with filament size of 35 micros at the 0.7 mm strand. We also made 547 filament conductors with 12 T non-Cu Jc values of about 2000-2200 A/mm² with filament size of 25 micros at the 0.85 mm strand, which has very low AC losses. For the tube type strands with APC, our recent APC Nb₃Sn wires with Ta and Zr doping demonstrated substantial grain refinement and significantly increased J_{c,nonCu}, while retaining the high B_{c2} values of the best ternary Nb₃Sn conductors. The non-Cu J_c of these APC conductors has reached nearly 1500 A/mm² at 16 T/4.2 K, which approaches the current CERN FCC spec. Their layer J_c reaches 4700 A/mm² at 16 T/4.2 K - more than double the present best ternary Nb₃Sn conductors. In this paper, we will report the progress on both wires and share the recent breakthroughs.

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