

Development of a hybrid superconducting dipole magnet with the magnetic field beyond 14 T

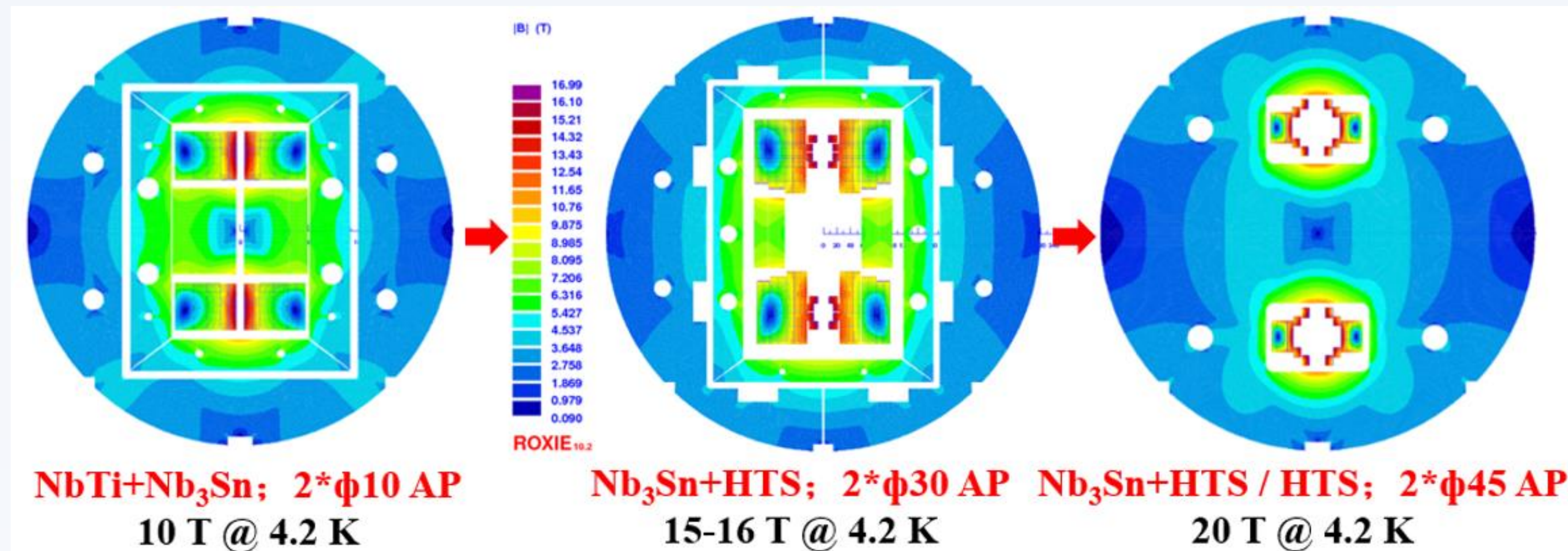
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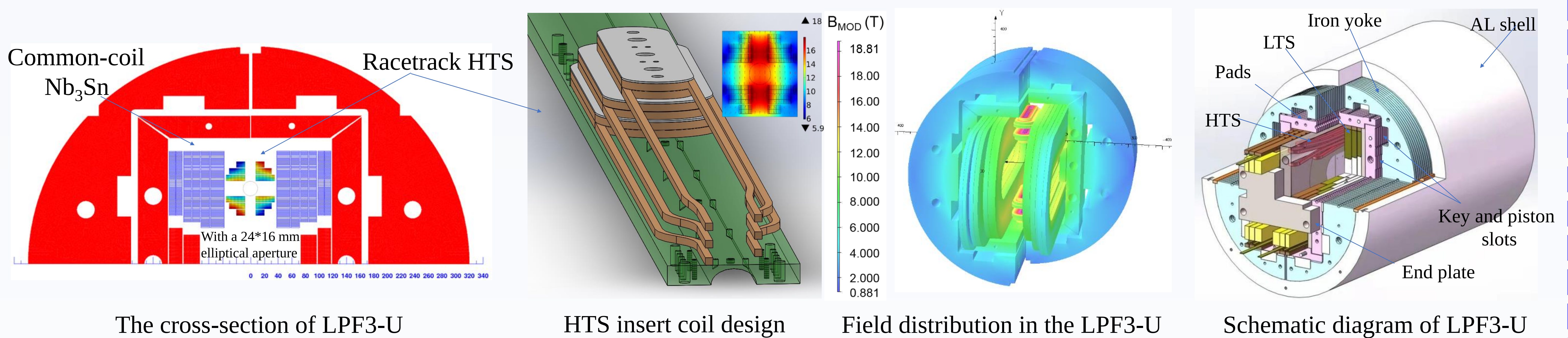
High field dipole magnets R&D steps



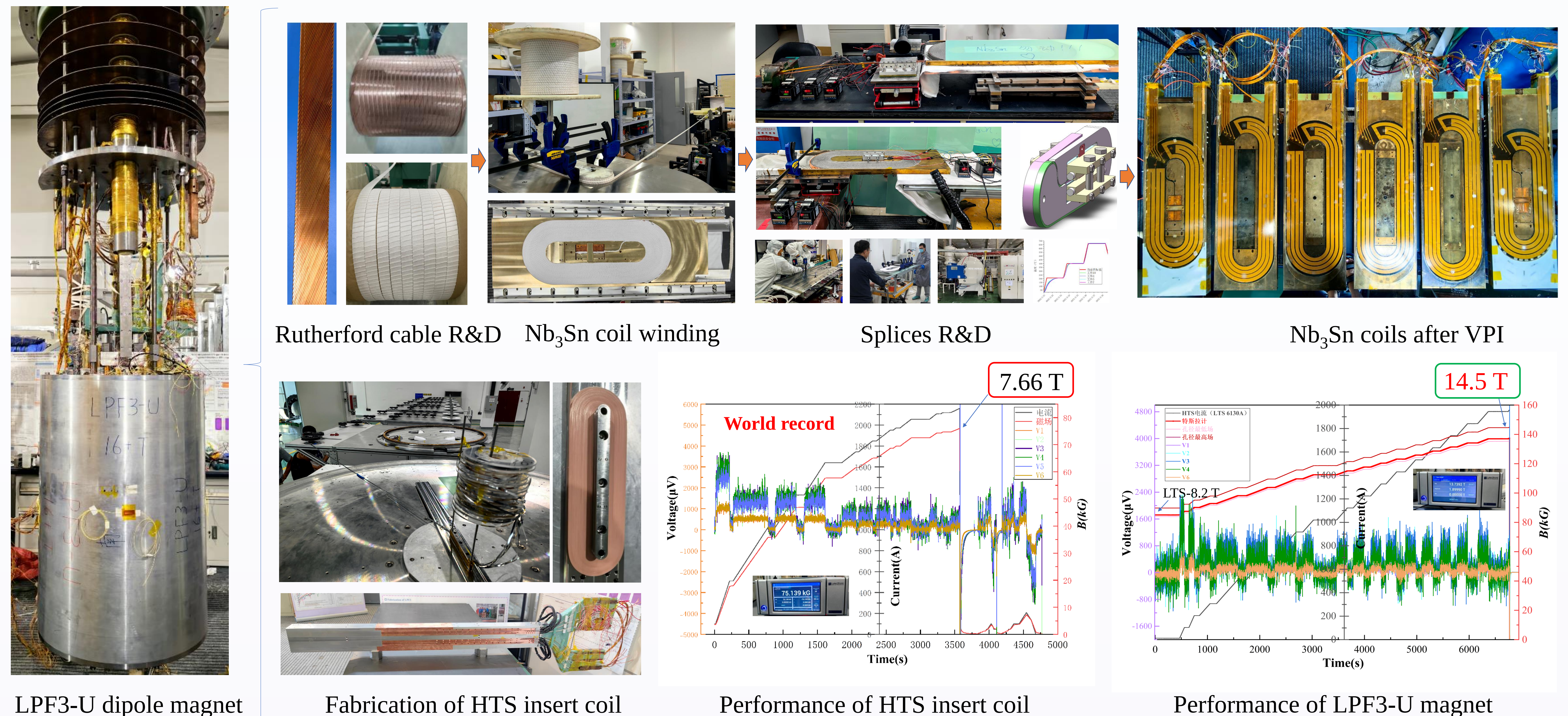
Specification:

The fabrication of high field dipole magnets				
R&D steps	Magnet name	Aperture diameter	Main field	Status
Step 1	LPF1	10 mm	10.23 T	Completed
	LPF1-S	12 mm	10.71 T	Completed
	LPF1-U	14 mm	12.47 T	Completed
Step 2	LPF3-U	~20 mm	14.5 T	Completed
	LPF3-U1	~30 mm	To be 16 T	On going
Step 3	LPF4...	~50 mm	Beyond 16 T	Next

Design of the hybrid dipole magnet - LPF3-U (LTS-10 T + HTS-6 T)



Fabrication and performance tests of LPF3-U dipole magnet



A series of subscale dipole magnets featuring hybrid NbTi, Nb₃Sn, and REBCO superconducting coils have been developed at IHEP, with progressively enhanced design complexity and electromagnetic performance. The most recent prototype, LPF3-U, achieved a peak field of 14.5 T within a 24×16 mm aperture. Currently, an upgraded magnet, LPF3-U1, is under assembly, with performance testing scheduled for December 2025. This enhanced prototype is anticipated to demonstrate further improvement in the central magnetic field strength.