



In-House Fabrication of Outsert Coil 1 for the 100T Pulsed Magnet



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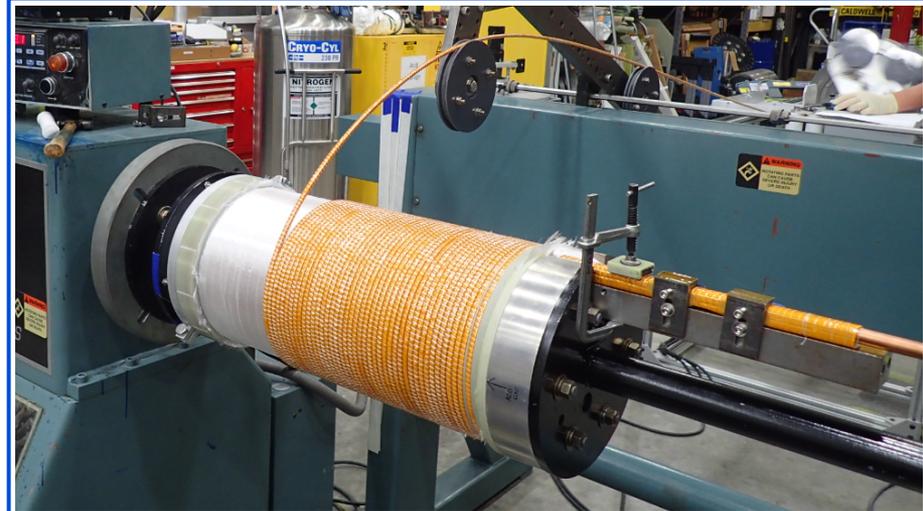
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Pulsed magnets provide an excellent example of applied metal fatigue: magnets simply wear out after a certain design lifetime and must be replaced. MagLab engineers and technicians at our Tallahassee and Los Alamos campuses have recently collaborated to fabricate a large coil for the outer coil set of the 100T pulsed magnet, which is the flagship magnet of our Pulsed Field Facility. *This is the first pulsed coil of such a large size to be fabricated in-house.*

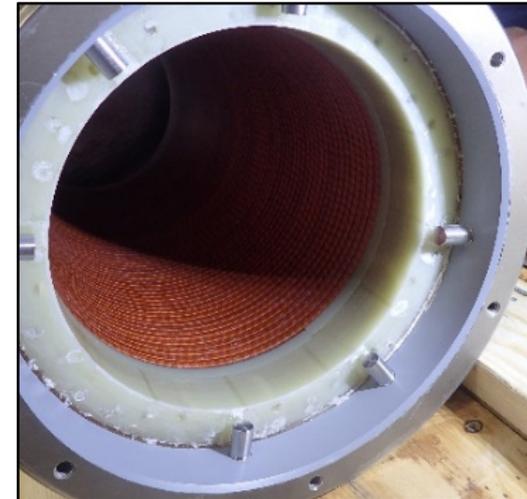
Previously, pulsed coils of this size were made commercially. However, a few years ago, the MagLab developed the capability to fabricate much larger superconducting coils using cable-in-conduit (CIC) superconductors for hybrid magnets now in Tallahassee, Berlin, and Nijmegen. *The capabilities previously developed for CIC magnets are now enabling our own large pulsed coils to be fabricated in-house at the MagLab.*

All conductor undergoes extensive nondestructive examination via eddy currents and the wound coil is inspected for quality through a number of electrical checks. Fabrication of the first coil in Tallahassee has been completed and the coil was delivered to the Los Alamos campus for final reinforcement.

In-house fabrication enables a much higher level of quality control of these exotic coils that must incorporate high-strength nano-composite conductors, highly-deformable Nitronic-40 shells, high modulus metal sheets, and a commercial fiber-epoxy overwrap in order to deliver world record pulses to the MagLab's users.



Above: Winding of the 65cm long pulsed coil. The leads to and from the coil can be seen extending another 24cm to the right.



Right: View down the 22.5cm diameter bore of the near completed coil, into which the insert coil for the 100T pulsed magnet will fit.

Facilities used: Magnet Science & Technology Division, Large Coil Fabrication Facility; Pulsed Field Facility, Magnet Engineering Team.

Citation: D. N. Nguyen, J. Michel, C. H. Mielke, "Status and Development of Pulsed Magnets at the NHMFL Pulsed Field Facility", **IEEE**

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