Magnet Division Facilities

Complete equipment for producing magnets wound using Rutherford cable (e.g., RHIC, LHC), including cable insulation and inspection, coil winding and curing to a precise size, assembly of coils, collars, and yokes into cold mass, insertion of cold mass into cryostat. This equipment backs up the existing RHIC spares, but has never been needed for this purpose. Much of the RHIC tooling was used for the LHC dipoles. It was also used to make the fast-pulsed magnet for GSI.

Specialized software and hardware for the CAD/CAM "direct wind" facility. The software can be used to design coils with windings that generate harmonics not allowed by symmetry and can compensate for certain imperfections in the winding surface. Eleven parameters are needed to specify operation of the direct wind machine.

Automatic coil winder designed to wind racetrack coils using brittle superconductors (e.g., reacted Nb_3Sn, HTS) as well as ductile superconductors (currently, non-reacted Nb_3Sn for LARP magnets). Coils as long as 20 m can be wound.

Two furnaces for reacting Nb_3Sn, 1m vacuum and 4m argon flow. The 4m oven will be delivered in August.

Cryogenic test facilities. Two refrigerators, both connected to vertical dewars and storage dewars. One refrigerator is used to operate the Magcool horizontal test facility used to test magnets in cryostats. There are a total of six dewars. Two can test cold masses up to 4.5m long. The remaining four can test cold masses up to 1m long and are designed for cable ("short sample") testing. A separate facility is set up for testing superconducting wires.

Magnetic field and related measurement equipment. Rotating coils with a variety of lengths and diameters for measuring DC and slowly varying fields. NMR and Hall probes. Dipole and quadrupole reference magnets. A non-rotating coil system for measuring fast-pulsed magnetic fields. Equipment for measuring energy loss due to magnet cycling. Equipment for measuring and controlling vibration (part of ILC work).