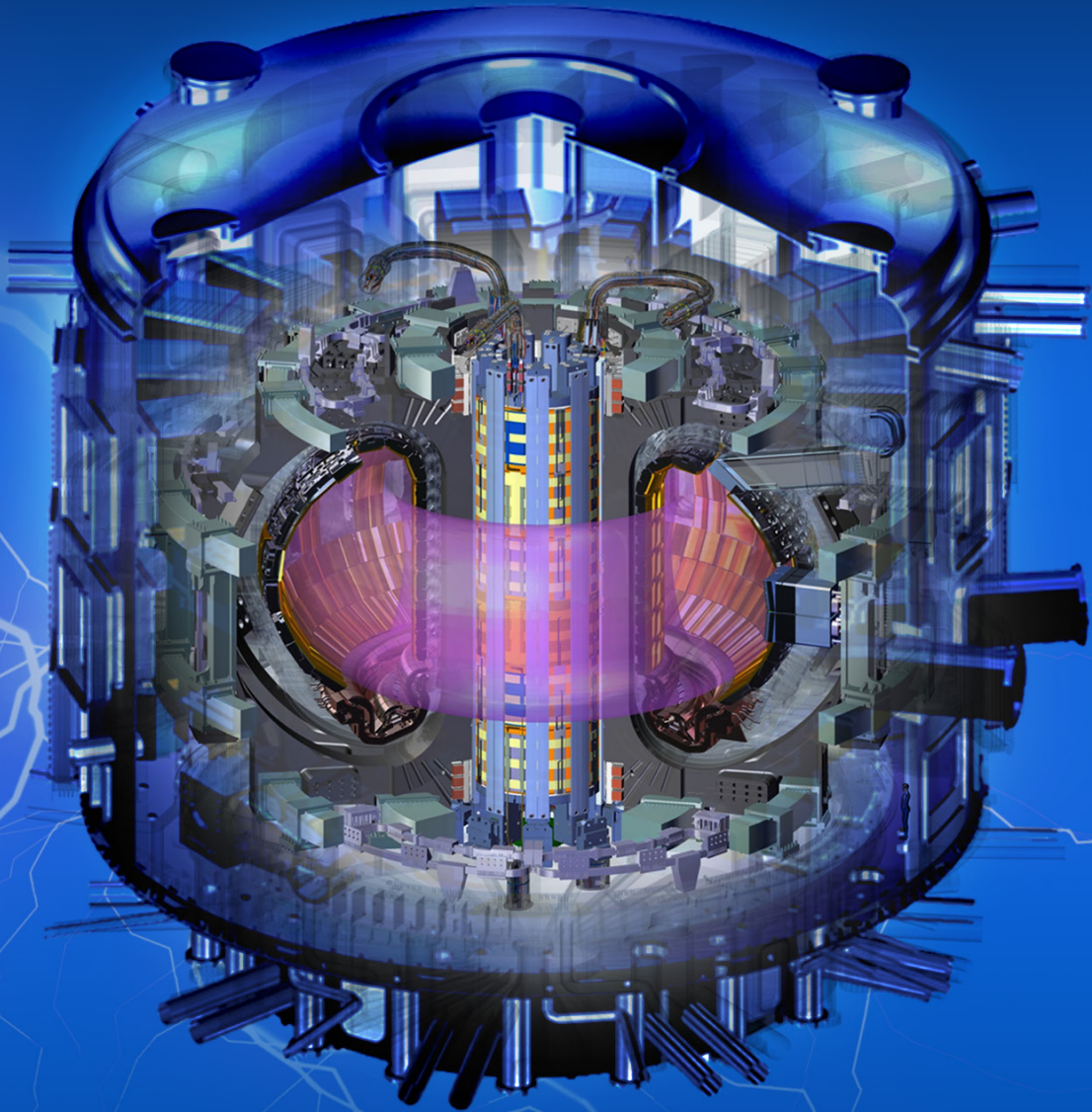


ITER CENTRAL SOLENOID

The heart of the international fusion energy program



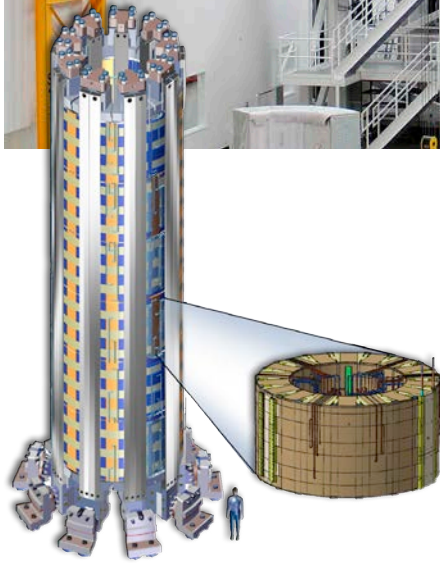
General Atomics is fabricating one of the world's largest and most powerful superconducting magnets for ITER – an unprecedented scientific collaboration of 35 nations.

The Central Solenoid is the heart of ITER. The 5-story, 1,000-ton magnet will drive 15 million amperes of electrical current in ITER's fusion plasma for stabilization. Each coil will be 7 feet tall and 14 feet wide with 4 miles of superconducting cable, powering ITER in its quest to prove that nuclear fusion – the process that powers the stars – can produce virtually limitless safe, clean and renewable energy.

SCIENCE AND TECHNOLOGY FOR ITER



ITER Central Solenoid Fabrication Facility



ITER Central Solenoid consists of 6 modules and a structure with an overall height of 59 feet



Superconductor is wound to high tolerance

ITER CENTRAL SOLENOID PRECISION ENGINEERING

- **Winding:** Forming a module from 3.5 miles of conductor. The conductor consists of Niobium-Tin superconducting cable in a 2" square stainless steel jacket
- **Heating:** Formed module is processed in a convection furnace to create the superconducting alloy. The month long process includes heating to 1200° F with constant temperature hold times exceeding 350 hours
- **Insulating:** The 560 turn coil is lifted and each turn separated to allow for wrapping of six layers (180 miles) of insulating tape
- **Encapsulating:** Coil is placed in a mold then heated and injected with resin
- **Testing:** Magnet coils are cooled to -450°F (4°K) and tested at a current of 48,500 Amps to simulate ITER operations



Heat treatment furnace



Insulating wrapping machine

OTHER ITER TECHNOLOGIES

- Low energy loss, high-power microwave transmission line components
- Software for real-time plasma control
- Methods to prevent uncontrolled collapse of ITER plasmas and high energy bursts from plasma edge using internal stabilization coils
- Low Field Side Reflectometer: A diagnostic using microwaves to measure plasma density profiles
- Wide Angle Visible & Infrared Viewing System: Set of diagnostic cameras to monitor for hot spots in ITER plasma chamber
- Toroidal Interferometer Polarimeter: Diagnostic to measure plasma density distribution
- Archiving methods for storing multi-gigabytes of ITER experimental data

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