

Critical Equipment for International Mega Science Project

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Why in News?

Recently, India has developed and delivered the first of three beam catcher units to the FAIR for International Mega Science Project .

Beam Catcher Equipment

- This equipment is a critical part of the **super fragment separator (super-FRS)** that produces radioactive beams.
- **Function** - Absorbs remnants of primary heavy-ion beams (0.4–1.5 GeV/nucleon) after hitting production targets.
- **Energy Deposition** - 29 kJ per spill in graphite within 50–100 ns pulses; peak density 300 J/g per pulse.
- **Challenge** - High thermal shock waves in absorbers.
- **Structure** - Vacuum chamber (1600 mm × 600 mm × 2620 mm) at 10^{-7} mbar.
- **Materials** - Fine-grained graphite and hyper-pure copper absorbers.
- **Cooling** - Water-cooled to prevent melting.
- **Shielding** - Iron plates for radiation protection.

FAIR - Facility for Antiproton and Ion Research

- **Location** - Darmstadt, Germany.
- **Founding Members** - Finland, France, Germany, India (the only non-European shareholder), Poland, Romania, Russia, Slovenia and Sweden.

India signed convention on 2010 at Wiesbaden.

- Funded jointly by **Department of Science and Technology (DST)** and **Department of Atomic Energy (DAE)**.
- **Bose Institute, Kolkata** is the nodal Indian institution and shareholder

in FAIR GmbH.

Other Indian Contributions to FAIR

- **Ultra-High Vacuum Chambers**
- **IT and Diagnostic Cables**
- **Power Converters**
- **Cryogenic Components**
- **Detector Systems**

Reference

[PIB | FAIR](#)

