

- **JET** (world largest operating Tokamak) initially as joint undertaking (until 1997)
  - central team, access
  - Smaller number of visiting scientist
  - No distributed access to data or resources

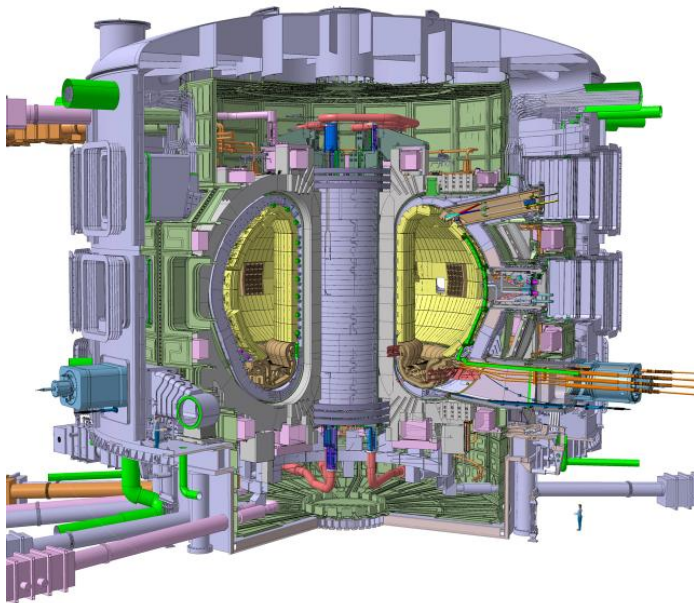
- 1997 re-organised under EFDA - European Fusion development agreement
  - Pan European user community
  - Small semi-permanent staff
  - ~600 remote collaborators
  - Experimental campaigns with researchers travelling in
  - Major change towards distributed user basis
  - Still central, local data access and computing resources

# ITER – an International Collaboration



China EU India Japan Korea Russia USA

“ITER aim is to demonstrate that it is possible to produce commercial energy from fusion.”



First plasma 2018, full operation 2025 (!)

## **Experimental facility:**

- 10Gbit/s during discharges, 500-1000s
- 20PB/year (lower bound estimates)

## **International partners:**

- Data replication – at least two offsite rep.
- (Near) real time data streaming, inline modelling data to remote centers
- “Semi” remote operation
- Middleware interoperability → agreement on single technology (most interfaces will be centrally managed/decided!)
- Resource sharing/policies
- IPR challenging issue.
- ~3000-4000 remote participants

## **Nuclear installation:**

- Security
- licensing

# Opportunities/challenges!



- Network connectivity – global scale
- Governance models (several EU agencies, number of international partners, ITER IO...)[EUFORIA, FUSION VO, EFDA,...]
- New, enhanced role of modelling and analysis
  - Integral with machine exploitation
  - Extreme range of resource needs (from smaller local ITER resources to PRACE level installations in ITER partners... and beyond)
  - Complex range of interdependent tools required for even basic understanding level - workflow organization ~100 interacting apps.
- Data access and storage (distributed exploitation!)
- Data provenance and QA
- Large international user base – and “ownership”
- Thematically well aligned with e-infrastructures scope and possibly strong need for connectivity, but,
  - **HOW TO BRING IT ALL TOGETHER TO A SUCCESS STORY FOR SCIENCE DRIVEN e-INFRASTRUCTURES?**