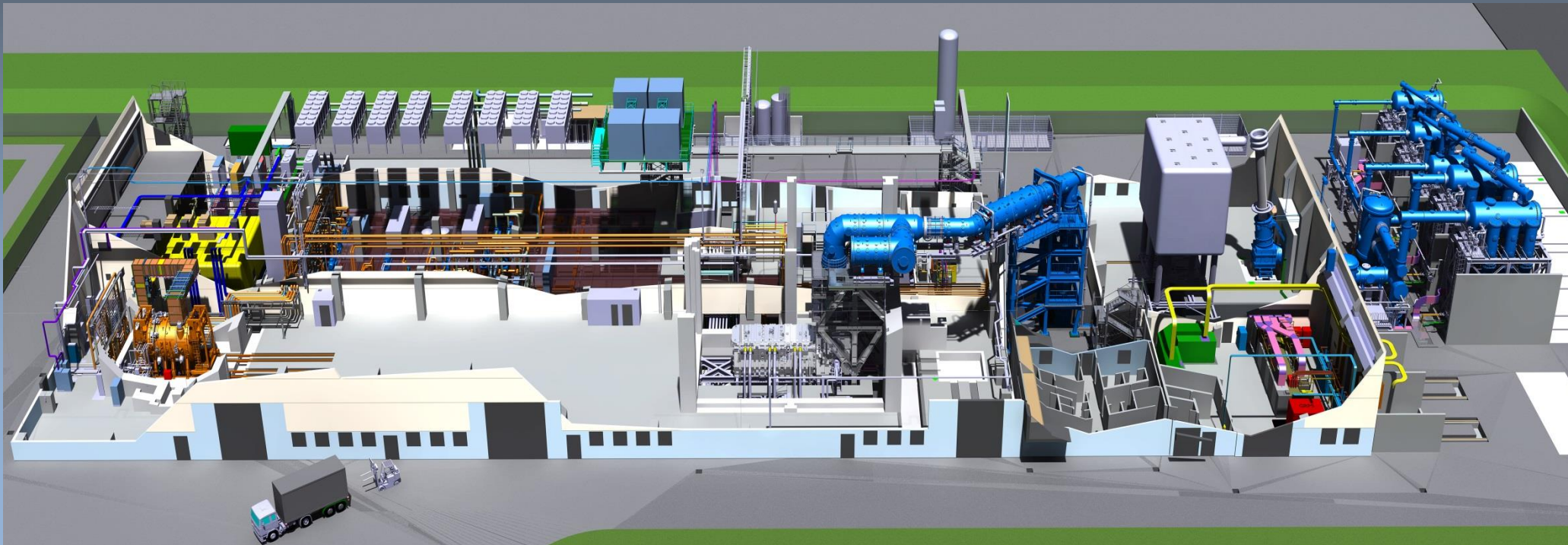


NBTf THE PARTNERS CONTRIBUTION



EUROPE

Fusion for Energy contributes in-kind with:
 Auxiliaries: cooling, vacuum and gas injection systems, SF6 gas handling and storage plant, cryogenic plant
 SPIDER and MITICA mechanical components, including beam sources and accelerators
 SPIDER power supply and high voltage components
 MITICA power supply conversion system and air-insulated HV components
 I&C : Instrumentation and Control (CODAS, Interlock, Safety)

ITALY

Consorzio RFX contributes with:
 Buildings and infrastructures
 - Design manufacturing follow-up
 - Installation, Integration and commissioning
 - Scientific exploitation

JAPAN

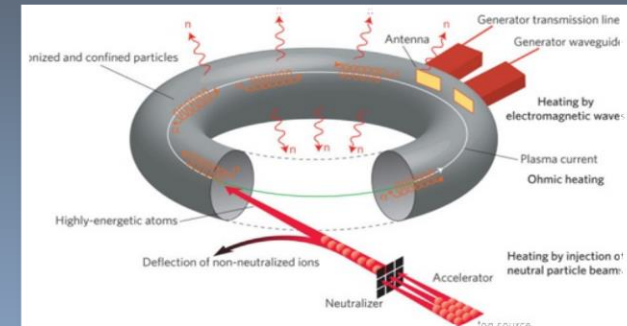
Japan Domestic Agency contributes in-kind with:
 The 1MV components of MITICA power supply system
 Collaboration in scientific exploitation

INDIA

India Domestic Agency contributes in-kind with:
 SPIDER calorimeter
 SPIDER Acceleration Grid and PowerSupply
 Collaboration in scientific exploitation

NBTf

NEUTRAL BEAM INJECTION SYSTEM



ITER needs the
**POWER OF THE
 NEUTRAL BEAM**
Three time faster

To heat the huge plasma volume the particles will have to move three time faster than in previous machines in order to penetrate far enough into the plasma.

NBTf

A dedicated facility in Padova (Italy) to test and develop the high-energy atom source and the Injection System at 1MeV for plasma heating in ITER.



The ITER ion source development is been carried out in Italy at Consorzio RFX.



fusionforenergy.europa.eu



www.iter.org



www.igi.cnr.it



www.fusion.qst.go.jp/ITER



www.iter-india.org

NEUTRAL BEAM INJECTION FOR **ITER**



ITER International Thermonuclear Experimental Reactor is the *large-scale* prototype of a fusion power plant, under construction in Cadarache (France). ITER will rely on two neutral beams that will work in concert to provide the input heating power of 33 MW required to bring the plasma to fusion temperature.

NBTF will host two independent test beds

SPIDER

Ion source prototype to test the full-scale ITER neutral beam ion source. The name of the project stands for: Source for the Production of Ions of Deuterium Extracted from an RF plasma. It will enter into operation in time to develop the ion source in MITICA

MITICA

Megavolt ITer Injector & Concept Advancement, full scale prototype of the ITER heating and current drive neutral beam injector with a deuterium beam of 1 MeV and energy 16,5 MW power, the same you need to supply.

4. CALORIMETER
Absorb the energy of the neutral beam and allows calorimetric measurements

3. RESIDUAL ION DUMP
Remove the residual ion particles

2. NEUTRALIZER
Neutralize the high energy ions by collisions with neutral gas

1. BEAM SOURCE
1.a Ion source
1.b 1MV accelerator
The most critical component of MITICA

FIGURES

- 15m (L) x 9 m (H) x 5 m (W)

PARAMETERS

- 1 MeV ion energy
- 40 A ion current
- 3600 s pulse length

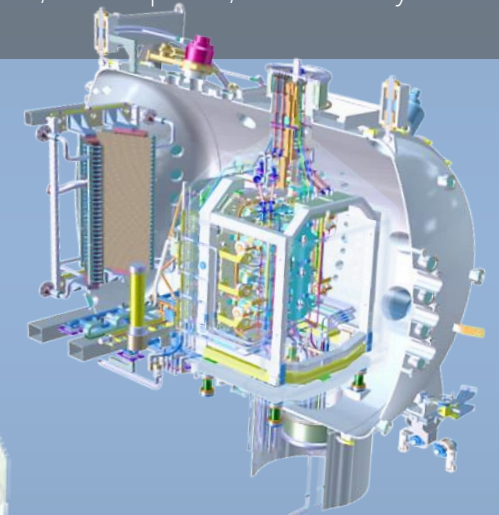
ACCELERATION OF THE NEUTRAL BEAM

Particle accelerators use high voltage to generate the intense electrical fields necessary to accelerate charged particles. The design of the acceleration grids rated to provide about 40 MW at 1MV for long pulses is very challenging.

The target beam power is of 16,7 MW for the duration up to 1 hour.

MITICA

to 1 MV



SPIDER

from 100 kV

