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ITER is the world’s largest tokamak nuclear fusion machine built under an International Partnership on a mesa

top in the Cadarache laboratory along the Durance river on eastern border of France. The machine is the world’s largest tokamak with radius of six meters and plasma volume of 840m^3. The machine will produce plasmas at

150million 0C and fusion power of half a gigawatt when burning deuterium and tritium confined in large vacuum chamber of 900m3. The machine will start a few years and run for 10 years to explore the feasibility of producing electric power using the process that runs the stars.

Stellarator Magnetic Confinement for Fusion Power

The Stellarator is a toroidal confinement system that elements the large plasma currents required in tokamaks. The helical magnetic field is created by the twisted coils on the vacuum chamber walls which eliminates the destabilization from the large toroidal plasma currents required in tokamaks. The plasma has complex shape and requires intense radio frequency heating RFH to reach the ignition and burning plasma state.

Oct 28, 2019 - IMAGE: The **Wendelstein 7**-**X** stellarator device at IPP Greifswald, Germany. view more ... HILOADS is scheduled to start in spring **2020**.

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**Wendelstein 7**-**X** at the Greifswald branch of IPP is a large stellarator with modular superconducting coils which enable steady state plasma operation in order to ...

Field Reversed Plasma Confinement Tri Alpha Energy

**High–Beta Relaxed Toroidal Plasma Confinement in an FRC**

High pressure plasmas with reversed magnetic fields with sheared rotational flows are ubiquitous in nature and are produced in Field-Reversed Confinement [FRC] laboratory plasmasRef.1. A large toroidal plasma current driven by Neutral beam injectors are used to maintain the steady state maintain closed magnetic fields. The Grad-Shafranov equilibria Ref 2,3 are created in long cylindrical chambers with mirror magnetic fields at the ends of the chamber. The beam driven toroidal or \theta plasma current produces the reversal of the axial magnetic. The ion and electron orbits are analyzed in the geometry of the Norman FRC Ref.1 which has 12 external coils and a negatively biased end plates to reflect the escaping small pitch angle electrons. There is strong FLR stabilization maintained in quasi-steady state by 8 NBI injectors at 35 KeV for producing a Ti ~2-3keV and Te ~ 200-500eV deuterium plasma.

1L. Schmitz, et al. *Suppressed ion-scale turbulence in a hot high-beta plasma,* Nature Communication, 2016 [7:13860 | DOI: 10.1038/ncomms13860]

TAE Technologies’ magnetic fusion plasma confinement device “Norman,” named for TAE co-founder Norman Rostoker. Simulations describe the dynamics of plasma inside the magnetic field and the way in which heat is confined in the system.

Fusion power researchers at TAE Technologies use supercomputers to develop magnetic fusion plasma confinement devices as a means to generate electricity.

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