

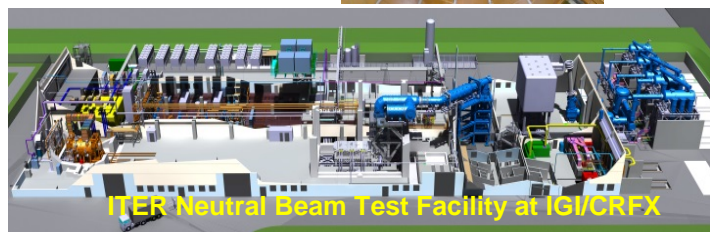
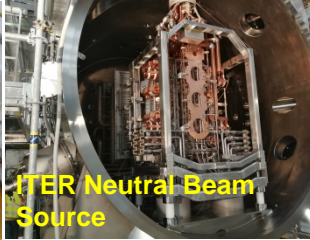
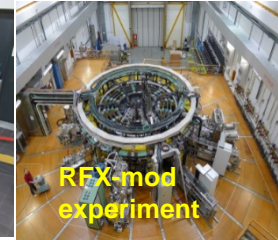
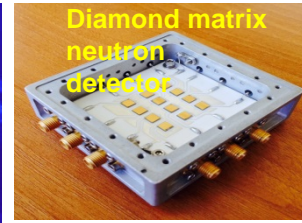
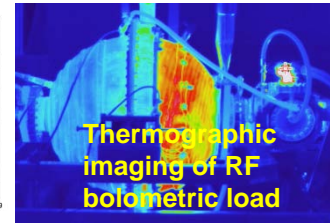
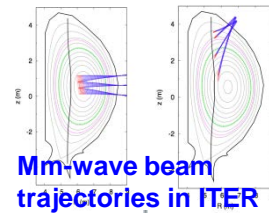


Project Area 20: Thermonuclear Fusion

Objective: The objectives of the Project Area are, according to the “Roadmap to the realization of fusion energy”, (a) the construction of the ITER device and its successful scientific and technological exploitation; (b) the conceptual design of the fusion reactor prototype DEMO; (c) the formation and training of the ITER-generation of scientist and engineers; (d) as an intermediate step between ITER and DEMO, the construction in Italy of the *Divertor Tokamak Test* facility aimed at investigating the power exhaust problem, the most critical issue in the burning plasma environment; (e) the development of theories and modeling tools for fusion plasmas.

Approach: IGI/CRFX and IFP activities are carried out in the frame of the *EUROfusion* Consortium, and of the *Fusion for Energy* and *ITER IO* Work Programmes. They include: the construction of the prototype of the ITER neutral beam injector (IGI/CRFX), the realization of the ITER mm-wave power launching system and of related prototype components (IFP), and the realization of several fusion plasma diagnostics; the participation to the experimental campaigns in the EU devices JET, AUG, TCV, WEST, W7-X and in the national facilities FTU and RFX-mod; the development of theoretical and numerical models of fusion plasmas; the participation to the construction and exploitation of DTT; the preparation to JT-60SA experiments including the procurement by IGI/CRFX of the quench protection circuits and of the power supplies for RWM control coils

Figures:



Scientific Impact/Results: Feasibility demonstration and optimization of the neutral beam injector for ITER, main heating system, key to fusion performance; optimization of the launching strategy of the mm-wave Gaussian beams injected from the upper launcher in ITER; understanding improvement of the Physics governing transport processes in fusion plasmas; preparation of the ITER operational scenarios; provision to ITER of key plasma parameter measurements and of reliable real-time plasma instability control. Test in DTT of robust power exhaust strategies for DEMO. Development of DEMO heating systems.