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OV/P-05: Overview of IFERC Project in Broader Approach Activities

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In order to contribute to ITER and to an early realization of the DEMO reactor, International Fusion Energy Research Centre (IFERC) started the activity from 2007/7/1 with 10 years period under the Broader Approach (BA) framework and now implements the three sub-projects; DEMO Design and R&D Coordination Centre (DDA & R&D), Computational Simulation Centre (CSC), and ITER Remote Experimentation Centre (REC). DDA & R&D: The DEMO Design Activity (DDA) in 2011 covered the studies on system codes, divertor, in Vessel Components, operation modes and maintenance. After benchmark test of the system codes by EU and JA, the codes were used to investigate an R=8.5m steady-state device and an R=10m pulsed device. In addition, comparison between steady-state and pulsed was done from engineering points of view. Maintenance study was another important issue and the various schemes were compared to review the features. These works will provide the databases toward conceptual designs planned in the period from 2015. As for R&D, preparation of facilities, installation of equipment, and preliminary R&Ds have been performed in 5 tasks (T1-T5). R&D activities are now being upgraded both in EU and JA for T1 (lifetime and off-axial mechanical properties and electrical properties of SiC_f/SiC composites), T2 (tritium accountancy etc. in Tritium technology), T3 (production and characterization of reduced activation ferritic/martensitic steel in Materials engineering), and T4/ T5 (mass production technology of Be-Ti intermetallic compounds for neutron multiplier as well as Li₂SiO₄ and Li₂TiO₃ for tritium breeders). CSC: The mission of CSC is to exploit high-performance and large-scale magnetically confined fusion (MCF) simulations. The Light House Project was carried out by using codes with a good scalability, in order to show MCF simulations could exploit a new research field or a frontier research. For example, particle-fluid hybrid simulations on energetic particle-driven instability and alpha particle transport have been performed in an ITER steady state scenario plasma, and it is found out that saturation level of multiple TAE modes with medium toroidal mode numbers is so low that the confinement of alpha particles is not degraded. REC: The mission of REC is to prepare ITER remote experiments and verify the functions. The overall plan of REC will be created in 2012.

Country or International Organization of Primary Author

NIFS, IFERC, Japan

Collaboration (if applicable, e.g., International Tokamak Physics Activities)

JA-IFERC-home-team, EU-IFERC-home-team, IFERC-collaborators

Primary author: Mr NAKAJIMA, Noriyoshi (Japan)

Presenter: Mr NAKAJIMA, Noriyoshi (Japan)

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