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Current Status of ITER Broader Approach Activities in the Framework of Japan-EU Collaboration - IFMIF/EVEDA & IFERC Projects in Rokkasho and Satellite Tokamak JT-60SA Project in Naka -

The Broader Approach (BA) Activities is an international collaborative project between Japan and EURATOM aiming at supporting the ITER Project and complementing developments toward a fusion DEMO reactor, on the same time frame with the ITER construction phase. The most important step for realization of fusion energy is the ITER Project, which will demonstrate a stable D-T burning operation to validate the scientific and engineering feasibility of fusion energy. This, however, is considered insufficient for the earlier achievement of fusion energy.

In parallel with the ITER project, additional and supplemental R&Ds are considered necessary as follows; (a) fusion materials development and their irradiation tests, (b) conceptual design and engineering assessments for the DEMO, (c) engineering developments of the breeding blanket including materials for tritium breeding, neutron multiplier, and also (d) research and developments of plasma to support ITER with exploring advanced tokamak scenarios. On such a understanding of fusion energy R&D common to both Japan and EURATOM, they agreed to initiate the BA Activities together with the ITER project.

The BA consists of the following three projects:

- (i) the project on the Engineering Validation and Engineering Design Activities for the International Fusion Materials Irradiation Facility (IFMIF/EVEDA);
- (ii) the project on the International Fusion Energy Research Center (IFERC); and
- (iii) the project on the Satellite Tokamak Program.

The new working site for IFMIF/EVEDA and IFERC is located in Rokkasho, Aomori Prefecture and that for the Satellite Tokamak Program is in Naka, Ibaraki Prefecture.

In Rokkasho, shortly after ratification of the BA Agreement in June 2007, the site development and construction of the research facilities were initiated in May 2008. New buildings and research facilities will be completed for the former two projects in March 2010.

For the IFMIF/EVEDA Project, design and manufacturing of the IFMIF Prototype Accelerator and the target facility (Li test loop) have been initiated. The Prototype Accelerator consists of an injector, a Radio-Frequency Quadrupole (RFQ) Accelerator, and a Super Conducting Linac, whose objective is to demonstrate continuous acceleration of high current (125 mA, CW) deuterium ion beams.

For DEMO design and R&D activities in the IFERC Project, the first three year of 2007-9 as the first phase have been devoted to workshops and preparation. The following years will be planned for full-fledged activities in collaborative design and R&D works. For the Computational Simulation Centre, selection of the high performance computer is now undergoing for operation of early in 2012.

For the Satellite Tokamak Program, JT-60SA, it was assigned as a new project to reconfigure the JT-60 completely by reusing as many existing infrastructure such as the power supplies, heating devices, cooling systems, etc., as possible. The mission of JT-60SA is to contribute to the earlier realization of a DEMO reactor by resolving key physical issues in ITER. The JT-60SA device is capable of confining breakeven-equivalent class, high-temperature deuterium plasmas with superconducting toroidal and poloidal field coils. Full non-inductive steady-state operation with high normalized beta above no-wall stability limit will be pursued. The maximum plasma current is 5.5 MA for a highly shaped configuration. The heating system provides 34 MW of NB and 7 MW of ECRF for up to 100 s. The divertor target is water-cooled in order to handle the heat flux up to 15 MW/m². Construction of JT-60SA has been started at Naka with launching procurement of poloidal field magnet, vacuum vessel and in-vessel components, toward the first plasma foreseen in 2016.

In the poster session, overall current status of ITER BA Activities implemented as Japan-EU collaborative projects will be presented.

Auteur principal: Dr KURIHARA, Kenichi (Senior Principal Research Scientist, JAEA)

Orateur: Dr KURIHARA, Kenichi (Senior Principal Research Scientist, JAEA)