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OV/4-1: Progress of the JT-60SA Project

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The shared procurement and construction of the JT-60SA device by Japan and EU is progressing well, including preparation of the plan for key research and development. The JT-60SA device has been designed in order to complement ITER in all areas of fusion plasma development necessary to decide DEMO construction. Detailed studies to predict plasma performance have confirmed these capabilities. The tokamak construction will start in Dec.2012. JT-60SA enables explorations in ITER- and DEMO-relevant plasma regimes in terms of the non-dimensional parameters (beta, the normalized poloidal gyro radius, the normalized collisionality, the fast ion beta etc.) under ITER- and DEMO-relevant heating conditions (such as dominant electron heating and low central fuelling, and low external torque input). Detailed studies of plasma performance prediction support these capabilities. Under these conditions, heat/particle/momentum transport, L-H transition, ELM/RMP/Grassy-ELM characteristics, the pedestal structure, high energy ion behaviors and the divertor plasma controllability can be quantified. By integrating these studies, the project provides 'simultaneous & steady-state sustainment of the key performance characteristics required for DEMO' with integrated control scenario development. Assuming $HH=1.3-1.4$, the expected I_p for high beta-N ($=4.3$), high bootstrap fraction ($=70-80\%$) full non-inductive current drive is 2.1-2.3MA at the Greenwald density ratio ($=1$). The central reference of DEMO for JT-60SA is a compact steady-state reactor. However, the JT-60SA research project has to treat the 'DEMO regime' as a spectrum spreading around the reference design, and has to assess reliable DEMO design targets.

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