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Physics and operation oriented activities in preparation of the JT-60SA tokamak exploitation

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JT-60SA is a large fully superconducting new tokamak device being built under the Broader Approach Satellite Tokamak Programme jointly by Europe and Japan, and under the Japanese national program. The JT-60SA tokamak is due to start operation in 2019 and will be at the forefront of the international fusion programme for many years, both before and during the D-T phase of ITER operation. It will support the ITER experimental programme as a satellite machine and at the same time provide key information for the design of DEMO scenarios. Efficient start-up of operation and scientific exploitation of such a large experimental device by an international team is a challenging enterprise, in many aspects similar to what is expected for ITER. In order to optimize such a start phase, a broad set of preparation activities has been carried out for years and is now significantly intensifying. They involve the elaboration of the JT-60SA Research Plan, advanced modelling in various domains (scenario, MHD and control, fast particles, edge, divertor, etc.), feasibility and conception studies of diagnostics and other sub-systems (H&CD, matter injection and pumping, etc.) in connection with the priorities of the scientific programme, development and validation of operation tools (data and analysis system, remote participation, magnetic control, wall conditioning etc.). These activities are carried out in a coordinated way by a joint Japanese-EU JT-60SA Research Unit, with the EU team organized in the framework of the EUROfusion WPSA work package, in close interaction with the F4E JT-60SA home team. The logic and coherence of this approach, as well as the main results obtained so far, are presented and summarized in this work. A few examples only will be discussed in detail.

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