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The new ITER Baseline research plan and long-pulse/steady-state operations in ITER

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The ITER research plan has been recently re-elaborated to lay out a robust path to achieve the Project's fusion production goals and technical objectives. This includes changes to device and ancillaries configuration to minimize previously identified risks such as: changing plasma facing material of the first wall from beryllium (Be) to tungsten (W), modifying the heating and current drive systems mix as well as the phased introduction of water cooled components for the first wall. The initial phase of the operation, so-called Start of Research Operation (SRO) phase, will utilize an inertially cooled wall to minimize operational risks, address access to deuterium H-mode operations with pure electron heating leading to low neutron production and demonstrate the full technical capabilities of the tokamak at full field and current, including effective disruption mitigation. The first Deuterium-Tritium phase (DT-1) focuses on the achievement of the Project's Q=10, 500MW with burn duration of, at least, 300 s within ˜ 1% of the present neutron fluence objective of ITER. This will provide a scientific basis on burning plasmas as well as key information on the technical performance of the ITER systems, as necessary inputs to licencing for DT-2. The second Deuterium-Tritium phase (DT-2) will progressively demonstrate the Q≥5 long-pulse and steady-state operation with 1000s and 3000s of burn duration respectively, as strong candidates for plasma scenarios in future fusion power plants. Tritium breeding technologies will also be addressed by implementing the ITER test blanket module (TBM) program throughout the DT-1 and DT-2 phases. This contribution will describe the new ITER baseline research plan with an emphasis on the development of ITER long-pulse and steady-state operations, as well as open R&D issues and required activities.

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