# Assessment of the ITER baseline operation scenario using CORSICA

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The ITER baseline operation aims at demonstrating controlled burn of D-T plasmas in the type-I ELMy H-mode regime and with a high fusion gain (Q~10). Improved physics understanding and updated specifications of the ITER components are being continuously integrated to develop more reliable candidate ITER baseline operation scenarios [1-4]. An integrated modelling of the ITER baseline operation including entry to burn, flat-top burning plasma, and exit from burn was previously performed using CORSICA [5-6] within relatively narrow ranges of plasma parameters and operational conditions. In this work, the previously proposed candidate ITER baseline operation scenarios have been further improved with updated modelling features including the density evolution during the L-H transition, density profile peaking, updated EC system configuration, improved edge pedestal evolution and ramp-down shape optimization. Then, the feasibility of these scenarios has been investigated across a range of plasma parameters and operational conditions to take into account the modelling uncertainties. A set of comparative studies performed by varying assumptions of the H-mode threshold power and triggering conditions has shown that reliable access to H-mode would be possible across a wide range of density evolution time-scales during the L-H transition, if the W concentration is kept below $1.0\times10^{-5}$ and the isotopic mass dependence is included in the Martin H-mode threshold power scaling [7]. Another set of studies on the flat-top burning plasma performance conducted by varying the flat-top density, density profile peaking factor, edge pedestal estimates and combination of the ITER HCD systems has shown that Q~10 operation would be achievable with a moderate total auxiliary heating power (~50MW). An optimization of the current ramp-up and ramp-down studied by applying various HCD power waveforms has shown that early entry to burn puts the stress on the PF6 coil whereas late one reduces the poloidal flux available for the flat-top phase. The shape optimization was important for the ramp-down phase to avoid exceeding the force limits on the coils. The improved ITER baseline operation scenarios and analysis results presented in this paper will be a good basis for further development as the understanding on the burning plasma physics improves.

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