

Task Force I: Core Scenario Development

| Main objective | Deliverable |
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| Enhance and explore improved-performance scenarios | <ul style="list-style-type: none"> ▪ Improved capabilities to modify the pressure profile and their impact on energy and particle transport. ▪ Understanding of the pressure profile and assessment of the scalability of W7-X scenarios to next-generation devices (including model verification). ▪ Steady-state scenarios that integrate high core performance ($T_i > 2.5$ keV) with divertor detachment ($f_{\text{rad}} > 80\%$) and stationary impurity content for $t > 60$ s. ▪ Develop improved-performance scenarios resilient to high-Z impurities ($T_i > 2.5$ keV and no accumulation of injected tungsten). |
| Prepare for steady-state long-pulse operation | <ul style="list-style-type: none"> ▪ Preparation of control schemes by measuring actuator response and demonstrating the required diagnostic readiness (in particular real-time capabilities). ▪ Demonstration of scenarios with reduced need for active control ($T_i > 1.6$ keV and $(dW/dt)/W < 10\%$ for $10 \tau_E$ without active control). |
| Show readiness for fast-ion studies | <ul style="list-style-type: none"> ▪ Development of NBI and ICRH ($P_{\text{ICRH}} \approx 0.8$ MW) scenarios suitable to study fast-ion physics. ▪ Demonstration of adequate fast-ion diagnostic capabilities. ▪ Fast-ion confinement and orbit studies and validation of fast-ion calculations. |
| Develop stable low-field scenarios with and without high performance | <ul style="list-style-type: none"> ▪ Investigation of B-field dependences for reliable extrapolations to next-generation devices. ▪ Establishing stable high-performance high-beta scenarios ($> 10 \tau_E$ at $\langle \beta \rangle > 3\%$), preferably at reactor-relevant collisionalities ($\nu^* < 0.1$). ▪ Extension and mapping of the low-field operational space. |