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統合輸送解析スイートTASK3Dの適用による LHDプラズマにおけるエネルギー閉じ込め系統解析

Systematic investigation on energy confinement property in LHD plasmas by integrated transport analysis suite, TASK3D

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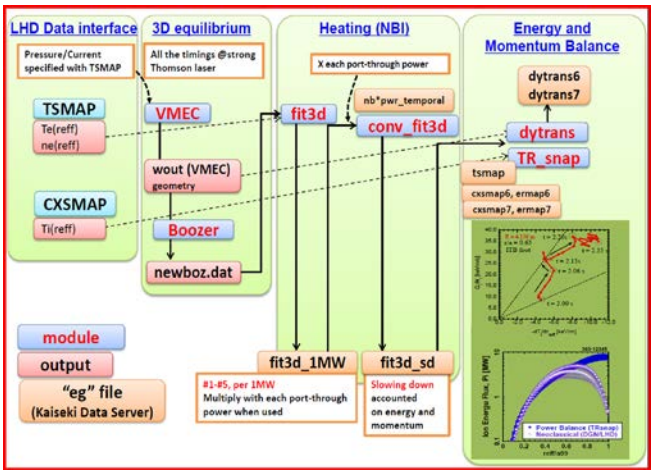
The Large Helical Device (LHD) experiments have steadily expanded the parameter regime of helical plasmas [1]. The energy confinement scaling for helical plasmas was deduced as ISS04 [2], in which, Gyro-Bohm characteristics was confirmed, and the configuration effect, such as effective helicity, was also pointed out. To increase physics understandings on energy confinement in helical (and furthermore, in general, toroidal) plasmas, systematic physics analyses should be performed incorporating radial profiles based on 3-dimensional equilibrium, not only investigating global energy confinement. The integrated transport analysis suite, TASK3D [3], being developed, has made this progress possible. As one of TASK3D applications to LHD experiment, a wide-range comparison between experimental and neoclassical energy balance has been extended to systematically investigate the energy confinement property in LHD plasmas.

This systematic investigation is expected to increase the predictive capability in scenario development towards future experiments and reactor design study. The progress of such comparison will be reported, and parameter dependence to be elucidated will be compared to that obtained from simulation study such as described in Ref.[4].



TASK3D-a01(Analysis Version): Calculation Flow

Newly implemented logo for TASK3D activity

References

[1] O.Kaneko, H.Yamada et al., Nucl. Fusion 53 (2013) 104015.
[2] H.Yamada et al., Nucl. Fusion 45 (2005) 1684.
[3] M.Yokoyama et al., Plasma Fusion Res. 8 Special Issue 1 (2013) 2403016.
[4] M.Nunami et al., Plasma Fusion Res. 8 (2013) 1203019.