Integrated analysis of core and edge for HL-2M operation

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HL-2M is a new medium-sized tokamak under construction in Southwestern Institute of Physics (SWIP), dedicated to support the critical physics and engineering issues of ITER and CFETR [1]. The total 27MW of additional heating system including NBI, ECRF and LHRF, combined with a flexible magnet coil system, allows HL-2M to be an excellent experiment platform for testing a variety of advanced divertor conceptions [2, 3] and the high heating flux plasma facing component, as well as advanced operation regimes [4-8]. This paper analyzed kinds of plasma operation scenarios (baseline, hybrid and full non-inductive regime) of HL-2M by coupling core and edge with the integrated modeling code – CRONOS [9]. Influence of the density of the edge, pedestal, and the core peaking on various regimes is discussed. Subsequently, the heating loads deposited on the divertor baffle, in these operation regimes with a variety of divertor configurations, are assessed by further coupling with the SOLPS code [10]. Effects of the pumping of divertor and the carbon impurity splash from the wall, on the plasma performance for the condition of advanced divertor configurations (snowflake and tripod) is discussed. Moreover, the influence of neon injection is also considered. Corresponding scenario optimization compatible with moderate heating loads of the divertor baffle is explored.

Keywords: HL-2M, operation scenario, advanced divertor configuration, integrated modeling.

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