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Advanced Divertor Analysis of HL-2M

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Standard divertor and exact snowflake, snowflake-plus and snowflake-minus divertor configurations of HL-2M are designed. The potential properties of these divertors are analyzed and presented: low poloidal field area around X-point, connection length from outside mid-plane to the primary X-point, target plate design and magnetic field shear. The results show that the snowflake configurations not only can reduce the heat load at divertor target plates, but also may improve the magneto-hydrodynamic stability by stronger magnetic shear at the edge. According to the vacuum vessel geometry of HL-2M, a divertor target geometry which is suitable for HL-2M divertor configurations (standard divertor, snowflake divertor and tripod divertor configurations) has been designed to reduce the peak heat load on the target to an acceptable level. The heat load on divertor targets with different core plasma parameters and divertor configurations are investigated by SOLPS5.0. The linear characteristics of peeling-ballooning (P-B) modes, transient heat flux bursts up due to ELMs and the distribution and evolution of the heat load on targets of HL-2M tokamak for the different divertor configuration will be presented using BOUT++.

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