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Edge Plasma Characteristics in a Snowflake Magnetic Configuration[1] M.V. UMANSKY, R.H. BULMER, R.H. COHEN, T.D. ROGNLIEN, D.D. RYUTOV — A snowflake configuration for a diverted tokamak uses a 2^{nd} order null of the poloidal field instead of the standard 1^{st} order null. Geometrical properties of snowflake divertor are favorable for reducing heat flux on divertor surfaces, due to stronger fanning of the poloidal flux, larger radiating volume, and larger connection length in the scrape-off layer. Additional potential benefits include better control of ELM activity via the effect on the q-profile just inside the separatrix, and blob dynamics via the stronger magnetic shear near the second-order null point. This study presents a quantitative assessment of performance of snowflake divertor for a high-power tokamak. The analysis utilizes the MHD equilibrium code Corsica and edge transport code UEDGE. Divertor performance is compared for a high-power tokamak with standard and snowflake-like configurations for the same core plasma parameters. For a range of studied cases, the snowflake divertor peak heat-load on the target plates is significantly reduced compared to the standard divertor due to larger plasma-wetted area and larger fraction of power radiated in the edge.

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