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Radiative snowflake divertor studies in DIII-D

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Abstract

Recent DIII-D experiments assessed the snowflake divertor (SF) configuration in a radiative regime in H-mode discharges with D_2 seeding. The SF configuration was maintained for many energy confinement times (2-3 s) in H-mode discharges ($I_p = 1.2$ MA, $P_{NBI} = 4-5$ MW, and $B \times \nabla B$ down), and found to be compatible with high performance operation (H98y2$\geq$ 1). Even though the two studied SF configurations, the SF-plus and the SF-minus, have a different placement of the secondary null (private flux vs common flux, respectively), and differences in the magnetic geometry and effects on particle and heat transport, similar results were obtained. The stored energy lost per edge localized mode (ELM) was reduced, and significant divertor heat flux reduction between and during ELMs was observed over a range of collisionalities, from lower density conditions toward a higher density H-modes with the radiative SF divertor.