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Application of the Radiating Divertor Approach to Innovative Divertor Concepts,* T.W. Petrie, A.W. Leonard, T.C. Luce, F. Turco *General Atomics*; S.L. Allen, M.E. Fenstermacher, C.T. Holcomb, C.J. Lasnier, V.A. Soukhanovskii, *LLNL*; E. Kolemen, *PPPL*; J.G. Watkins, *SNL* – Recent experiments on DIII-D have assessed the effectiveness of 3 innovative tokamak concepts under radiating divertor (RD) conditions: (1) high performance standard double-null divertor (DND) plasmas, (2) high performance double-null "snowflake" (SF-DN) plasmas, and (3) single-null H-mode plasmas with different isolation from their divertor targets but otherwise identically prepared. Significant reductions in both divertor heat flux and divertor electron temperature were observed in both standard DND and SF-DN plasmas under neon/deuterium-based RD conditions, while maintaining high performance metrics, such as $\beta_N \cong 3.0$ and $H_{98(Y,2)} \cong 1.4$. Not only is the peak heat flux reduced by extending the parallel connection length ($L_{//\text{-}XPT}$) between the X-point and divertor targets, thereby enhancing the effect of cross-field diffusion, but also the effectiveness of the *RD* conditions is markedly improved at larger $L_{//\text{-}XPT}$. In general, our analyses support the attractiveness of all three of the above concepts under *RD* conditions, both in reducing peak heat flux and in maintaining good to excellent H-mode energy confinement.

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