Abstract Submitted
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Model of a convective, fully detached snowflake divertor[1] D.D. RYUTOV, Lawrence Livermore National Laboratory, S.I. KRASHENINNIKOV, University of California at San Diego, T.D. ROGNLIEN, Lawrence Livermore National Laboratory — A general description of a fully-detached divertor based on a snowflake configuration is presented. We exploit a characteristic feature of this divertor: the presence of a significant zone of a very low poloidal magnetic field around the second-order (or near-second-order) poloidal field null. The virtual absence of the poloidal field should give rise to intense curvature-driven plasma convection in this zone and a resulting effective sharing of the plasma outflow between the four divertor legs; the broadening of the flow in each of the legs can also be expected [1-3]. Taken together, these features bring the divertor plasma to the state where the full detachment can be anticipated. A possible shape of the divertor is presented, which involves five "domes," similar the single dome envisaged for the ITER divertor. The resulting estimated heat loads do not exceed 1.5 MW/m2. This configuration also reduces the peak ELM heat flux owing to both convective spreading of the heat flux and increased connection length.

[1] D.D. Ryutov et al, PPCF, 54, 124050 (2012).
[2] V.A. Soukhanovskii et al, 19, 082504 (2012).
[3] H. Reimerdes et al, PPCF, 55, Dec. 2013.

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