Abstract Submitted
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Study of Lithium Vapor Flow In a Detached Divertor using DSMC code[1] ERIC EMDEE, JACOB SCHWARTZ, ROBERT GOLDSTON, MICHAEL JAWORSKI, Princeton Plasma Phys Lab — A detached divertor is predicted to be necessary to handle the heat fluxes of a demonstration fusion power plant [1]. The lithium vapor box divertor has poloidal baffles to form distinct chambers and contains dense lithium vapor to cause detachment. These chambers would be differentially pumped via condensation, resulting in flow at Knudsen numbers 0.01-0.5 and densities 10^{19}-10^{23} m^{-3}. This divertor geometry is predicted to handle the estimated heat flux while also localizing the vapor in the divertor [2]. We provide a simulation of the divertors lithium vapor flow using the SPARTA Direct Simulation Monte Carlo (DSMC) code [3]. Lithium mass flow, vapor pressures, and temperatures within each chamber are given. Preliminary simulations of a vapor box divertor similarity experiment are within 30% of an ideal-gas choked nozzle flow calculation.

1. R.J Goldston, J. Nucl. Mat. (2015)
http://dx.doi.org/10.1016/j.jnucmat.2014.10.080
2. R.J Goldston et al. Phys. Sc. T167 (2016) doi:10.1088/0031-8949/T167/1/014017
3. M.A Gallis et al., AIP Conference Proceedings 1628, 27 (2014); doi: 10.1063/1.4902571

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