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Predictions For a Simplified Lithium Vapor Box Divertor Using SOLPS-ITER[1] ERIC EMDEE, ROBERT GOLDSTON, Princeton Plasma Physics Laboratory — The heat flux impinging on the divertor in future fusion power plants is predicted to be beyond the capabilities of a solid target, attached plasma divertor. Stable detachment, whereby the plasma pressure drops significantly along a magnetic field line as it approaches the divertor target, will thus be necessary. A relevant issue is confining this pressure drop to the divertor region. In past experiments, divertor detachment has typically been followed by strong radiation at the X-point, reducing pedestal performance. The lithium vapor box aims to radiate power via lithium vapor contained within the divertor region. Lithium vapor localization would occur via evaporation near the divertor target and condensation closer to the main chamber. In this way, the detachment of the plasma could be kept stable by a strong dependence of the lithium ionization rate on the poloidal location of the detachment point. New work will be presented on lithium vapor box modeling using SOLPS-ITER. Realistic PFC geometry and EFIT equilibrium for EAST are used. The lithium fraction is shown to be heavily reduced with the addition of a neutral deuterium puff. Effects of deuterium puff location, core density, and wall recycling coefficient on radiated power and impurity concentration are also explored.

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