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## 12.34 Lithium vapor flow measurements on a Lithium Vapor Box Divertor similarity experiment

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The lithium vapor box divertor is a concept for handling the extreme divertor heat fluxes in magnetic fusion devices. In a baffled slot divertor, plasma interacts with a dense cloud of Li vapor which radiates and cools the plasma, leading to recombination and detachment. Before testing on a tokamak the concept should be validated: we plan to study detachment and heat redistribution by a Li vapor cloud in laboratory experiments. Mass changes and temperatures are measured to validate a Direct Simulation Monte Carlo model [1] of neutral Li. The initial apparatus and experiment is a 3 cm radius steel box containing 10g of Li held at 650°C as vapor flows out a wide nozzle into a similarly-sized box at a lower temperature. Diagnosis is made challenging by the required material compatibility with lithium vapor. Vapor pressure is exponential with temperature, so to validate mass flow models to within 10%, absolute temperature to within 3.6K is required. The apparatus is designed to be used with an analytical balance to determine mass transport. Details of the apparatus and methods of temperature and mass flow measurements are presented.

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[1] M.A Gallis et al., AIP Conference Proceedings 1628, 27 (2014); doi:10.1063/1.4902571.

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