

Abstract Submitted
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Advantages and Challenges of Radiative Liquid Lithium Divertor¹ MASAYUKI ONO², PPPL, Princeton University — Steady-state fusion power plant designs present major divertor technology challenges, including high divertor heat flux both in steady-state and during transients. In addition to these concerns, there are the unresolved technology issues of long term dust accumulation and associated tritium inventory and safety issues. The application of lithium (Li) in NSTX resulted in improved H-mode confinement, H-mode power threshold reduction, and reduction in the divertor peak heat flux while maintaining essentially Li-free core plasma operation even during H-modes. These promising results in NSTX and related modeling calculations motivated the radiative liquid Li divertor (RLLD) concept and its variant, the active liquid Li divertor concept (ARLLD), taking advantage of the enhanced Li radiation in relatively poorly confined divertor plasmas. It has been suggested that radiation-based liquid lithium (LL) divertor concepts with a modest Li-loop could provide a possible solution for the outstanding fusion reactor technology issues such as divertor heat flux mitigation and real time dust removal, while potentially improving the reactor plasma performance. Laboratory tests are also planned to investigate the Li-T recover efficiency and other relevant research topics of the RLLD.

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