

Abstract Submitted
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Scoping Studies for an Integrated PMI-PFC Test Facility¹ S.C. PRAGER, Princeton Plasma Physics Laboratory, AND THE PPPL PMI TEST FACILITY TEAM — Innovative plasma facing components (PFCs) are needed for next-step fusion experiments and beyond, and can be most efficiently developed in a dedicated test facility. In scoping studies for such a facility, we have considered a range of sources (to provide high heat fluxes to target PFCs to simulate the plasma-material interaction) and a variety of PFCs to be exposed. We have investigated sources ranging from small low-field devices for basic science studies to a 1/4 torus with the size and field of the NSTX upgrade outfitted with a source that provides 10 to 40 MW/m² for 5 seconds. Aiming toward solutions for DEMO-level PFCs, concepts that have been considered for testing include slow-flowing capillary-restrained lithium PFC modules, thick fast-flowing liquid walls and jets, and active PFC coatings and engineered solid surfaces. Extensive surface and plasma diagnostics, as well as modeling such as liquid metal MHD, will be needed to extrapolate the results to future tokamaks.

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