

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Tritium Plasma Experiment Upgrade for Fusion Tritium and Nuclear Sciences¹ MASASHI SHIMADA, CHASE N. TAYLOR, Idaho National Laboratory, ROBERT D. KOLASINSKI, DEAN A. BUCHENAUER, Sandia National Laboratories-Livermore — The Tritium Plasma Experiment (TPE) is a unique high-flux linear plasma device that can handle beryllium, tritium, and neutron-irradiated plasma facing materials, and is the only existing device dedicated to directly study tritium retention and permeation in neutron-irradiated materials [M. Shimada et.al., Rev. Sci. Instru. 82 (2011) 083503 and M. Shimada, et.al., Nucl. Fusion 55 (2015) 013008]. Recently the TPE has undergone major upgrades in its electrical and control systems. New DC power supplies and a new control center enable remote plasma operations from outside of the contamination area for tritium, minimizing the possible exposure risk with tritium and beryllium. We discuss the electrical upgrade, enhanced operational safety, improved plasma performance, and development of tritium plasma-driven permeation and optical spectrometer system. This upgrade not only improves operational safety of the worker, but also enhances plasma performance to better simulate extreme plasma-material conditions expected in ITER, Fusion Nuclear Science Facility (FNSF), and Demonstration reactor (DEMO).

¹This work was prepared for the U.S. Department of Energy, Office of Fusion Energy Sciences, under the DOE Idaho Field Office contract number DE-AC07-05ID14517.

Masashi Shimada
Idaho National Laboratory

Date submitted: 24 Jul 2015

Electronic form version 1.4