Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Ex Situ Characterization of Digital Holography in Preparation for Demonstration of In Situ Plasma-Induced Erosion Measurement (PhD Oral-24)[1] CARY SMITH, University of Tennessee, Knoxville, THEODORE BIEWER, TREY GEBHART, Oak Ridge National Laboratory, ELIZABETH LINDQUIST, University of Tennessee, Knoxville, C. E. THOMAS, Third Dimension Technologies — Digital holography has been proposed for *in situ* measurement of plasma facing component erosion. Progress on the development of a dual laser digital holography erosion diagnostic will be presented. The diagnostic images a surface region 1 centimeter in diameter and is capable of single or dual wavelength operation, with the ability to measure surface height changes of up to 4.5 microns in single laser mode and up to 2 millimeters in dual laser mode. Characterization results to be presented include *ex situ* measurements of plasma-eroded targets exposed to an electrothermal (ET) arc source with detected erosion of 150 nanometers/exposure. Measurements of a moving target, intended to simulate dynamic surface change detection, will also be shown; translations from 60 nanometers to 1 micron were recorded in single laser mode and from 50 to 380 microns in dual laser mode. The accuracy of the measurements will be compared with validation data and discussed in the context of image quality and noise levels. The characterization work indicates that coupling digital holography with the ET-arc for *in situ* erosion measurement can achieve a successful result, and the experiment plan for an *in situ* demonstration will be presented.

[1]This work supported by UT-Battelle, LLC under US. D.O.E. contract DE-AC05-00OR22725.

Cary Smith
University of Tennessee, Knoxville

Date submitted: 25 Aug 2020 Electronic form version 1.4