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Development of a Digital Holography Diagnostic for Surface Characterization at ORNL¹ T.M. BIEWER, Oak Ridge National Laboratory, Oak Ridge, TN, USA, C.E. THOMAS, Third Dimension Technologies, Knoxville, TN, USA — The Fusion and Materials for Nuclear Systems Division (FMNSD) at Oak Ridge National Laboratory (ORNL), in collaboration with Third Dimension Technologies (TDT), proposes to develop a digital holography (DH) surface erosion/deposition diagnostic for imaging 3D plasma facing component (PFC) surfaces in real time. Digital holography is a technique that utilizes IR lasers reflected from a material surface to form a holographic interferogram, which carries information about the topology of the surface when reconstructed. The interrogated surface (at a distance of 3 m) is a region of 2.3 cm x 2.3 cm, and the surface feature resolution is 10 micron or better in depth, around 1 mm transverse to the beam. This is being accomplished in a multi-staged research program at ORNL: 1) establishment of a single-laser DH system on the bench, 2) establishment of a dual-laser DH system on the bench, and 3) implementation of the dual-laser DH system on the Proto-MPEX device. The status of the diagnostic development effort will be presented.

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