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Two-Photon Absorption Laser Induced Fluorescence on Proto-MPEX THOMAS STEINBERGER, JACOB MCLAUGHLIN, West Virginia University, THEODORE BIEWER, Oak Ridge National Laboratory, EARL SCIME, West Virginia University — Two-photon Absorption Laser Induced Fluorescence (TALIF) is a non-perturbative spectroscopic technique that provides direct measurements of the temperature, bulk flow, and absolute density of neutral hydrogen in fusion-class plasmas. Recently, TALIF has been added to the suite of diagnostics on the Prototype Material Plasma Exposure eXperiment (Proto-MPEX) at Oak Ridge National Laboratory. Since TALIF is typically used to interrogate energetic ground state transitions, high intensity ultra-violet (UV) light is required. Here we generate 4 mJ, 8 ns pulses of 205 nm light with a Sirah Cobra-Stretch dye- laser. Laser light is injected in Proto-MPEX through high UV transmission sapphire vacuum windows. Implementation of TALIF on Proto-MPEX necessitates an injection beam path length of $\sim$ 20 meters. We present measurements in Proto-MPEX using both free space injection and fiber coupled injection. For both beamline options, measurements in krypton and xenon calibration gasses as well as the targeted neutral deuterium atoms were obtained confocally. Neutral deuterium measurements were made upstream of the helicon source region of Proto-MPEX for a range of D2 fuel gas pressures.

Thomas Steinberger
West Virginia University

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