

Abstract Submitted
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Two-photon absorption laser induced fluorescence (TALIF) neutral density measurements and two-fluid (plasma-neutral) 3D Extended-MHD simulations with PSI-TET on the HIT-SI3 experiment¹ D.A. SUTHERLAND, T.R. JARBOE, C.J. HANSEN, University of Washington, D.B. ELLIOTT, West Virginia University — Two-photon absorption laser induced fluorescence (TALIF) measurements were made on the HIT-SI3 experiment at the University of Washington through a collaboration with West Virginia University. Monatomic deuterium neutral densities of below $1 \times 10^{17} \text{ m}^{-3}$ were measured in $I_p = 10 - 13$ kA deuterium spheromak configurations that had electron number densities on the order of $n_e = 1 \times 10^{19} \text{ m}^{-3}$. These measurements suggest an ionization fraction of 99% or more in HIT-SI3 spheromak plasmas. Spatial and temporal information concerning the monatomic deuterium neutral density in HIT-SI3 will be presented. These data are being used to validate a self-consistent, multi-fluid (plasma-neutral) model that is currently being implemented in the PSI-TET 3D Extended-MHD code. Preliminary results from validation efforts will be presented, along with other plans for validation and proposed uses of this multi-fluid model on mainstream fusion devices.

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