Abstract Submitted
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**Modelling and analysis of flux surface mapping experiments on W7-X**[1] SAMUEL LAZERSON, Princeton Plasma Physics Laboratory, MATTHIAS OTTE, SERGEY BOZHENKOV, THOMAS SUNN PEDERSEN, TORSTEN BRÄUER, Max-Planck-Institut für Plasmaphysik, DAVID GATES, HUTCH NEILSON, Princeton Plasma Physics Laboratory, W7-X TEAM — The measurement and compensation of error fields in W7-X [1] will be key to the device achieving high beta steady state operations. Flux surface mapping utilizes the vacuum magnetic flux surfaces, a feature unique to stellarators and heliotrons, to allow direct measurement of magnetic topology [2], and thereby allows a highly accurate determination of remnant magnetic field errors. As will be reported separately at this meeting [3], the first measurements confirming the existence of nested flux surfaces in W7-X have been made. In this presentation, a synthetic diagnostic for the flux surface mapping diagnostic is presented. It utilizes Poincaré traces to construct an image of the flux surface consistent with the measured camera geometry, fluorescent rod sweep plane, and emitter beam position. Forward modeling of the high-iota configuration will be presented demonstrating an ability to measure the intrinsic error field using the U.S. supplied trim coil system on W7-X [4], and a first experimental assessment of error fields in W7-X will be presented. [1] Bosch H S, et al., IEEE Trans. on Plas. Sci 42, 3 (2014) [2] Otte M, et al., AIP Conf. Proc. 993, 3-10 (2008) [3] Pedersen T S, et al., this meeting. [4] Rummel T, et al., IEEE Trans. on Appl. Supercond. 24, 4200904 (2014)

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Samuel Lazerson
Princeton Plasma Physics Laboratory

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