Abstract Submitted
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Simulations of Low Power DIII-D Helicon Antenna Coupling DAVID SMITHE, THOMAS JENKINS, Tech-X Corporation — We present an overview and initial progress for a new project to model coupling of the DIII-D Helicon Antenna. We lay the necessary computational groundwork for the modeling of both low-power and high power helicon antenna operation, by constructing numerical representations for both the antenna hardware and the DIII-D plasma. CAD files containing the detailed geometry of the low power antenna hardware are imported into the VSim software's FDTD plasma model [1]. The plasma can be represented numerically by importing EQDSK or EFIT files. In addition, approximate analytic forms for the ensuing profiles and fields are constructed to facilitate parameter scans in the various regimes of anticipated antenna operation. To verify the accuracy of the numerical plasma and antenna representations, we will then run baseline simulations of low-power antenna operation, and verify that the predictions for loading, linear coupling, and mode partitioning (i.e. into helicon and slow modes) are consistent with the measurements from the low power helicon antenna experimental campaign [2], as well as with other independent models. Progress on these baseline simulations will be presented, and any inconsistencies and issues that arise during this process will be identified. Support provided by DOE Grant DE-SC0017843. [1] T. G. Jenkins and D. N. Smithe, Plasma Sources Sci. Technol. 24, 015020 (2015). [2] R. I. Pinkser, et. al., "Measurements of helicon antenna coupling in DIII-D," APS-DPP (2016).

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