Abstract Submitted
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Characterization of a 20 kW helicon source for fusion relevant plasma-surface interactions using microwave and electrostic diagnostics JUAN FRANCISCO CANESES, BOYD BLACKWELL, Australian National University, MATHEW GUENETTE, Australian Nuclear Science and Technology Organisation, CORMAC CORR, Australian National University — The MAGnetized Plasma Interaction Experiment (MAGPIE) is a non-uniform axial magnetic field helicon source built to study fusion relevant plasma-surface interactions. In this work we describe its operation with a new 20 kW pulsed RF source in H_2 and H_e under various discharge configurations. Diagnostics such as RF double probes and a 140 GHz heterodyne Michelson microwave interferometer are used to characterize the performance of the device over a wide range of operational regimes. During initial characterization we have measured plasma densities in excess of $1x10^{19}$ m^{-3} in H_2 at 12 kW of RF power. Finally, we report on recent work conducted in MAGPIE in close collaboration with the Australian Nuclear Science and Technology Organisation (ANSTO) and the Plasma Research Laboratory (PRL) where biased material samples are subjected to H_2 plasma. These samples are then analyzed ex-suti using a variety of material characterization techniques. Materials being investigated include graphite, diamond and tungsten.

Juan Francisco Caneses
Australian National University

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