Abstract Submitted
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Transport modeling of the ORNL high intensity linear RF plasma source[1] L.W. OWEN, Y.K.M. PENG, J.M. CANIK, R.H. GOULDING, ORNL, X. BONNIN, LIMHP, CNRS-UPR 1311, Université Paris 13, France — Recent progress in the electrode-less helicon hydrogenic plasma source[2] have motivated the development at ORNL of an RF-plasma source that magnetically links a helicon to a mirror cell in which the plasma is heated by EBW, ICH and whistler waves. The <4m long plasma column further includes a parallel transport region connected to a pumped target plate. Such a source is modeled at three levels using: a two-point model, a 1D-parallel Braginski's fluid model in which the plasma sources/sinks are computed using the kinetic Monte Carlo neutrals code DEGAS, and the 2D SOLPS code. The required source plasma parameters to achieve certain target plasma parameters, particularly at high plasma heat and particle fluxes, are found to be sensitive to the plasma and neutrals parameters in the helicon and RF mirror cells, the effective heating via various RF techniques, the plasma and neutrals boundary conditions at the target plates and around the RF-plasma heating zones, and the pumped reservoirs with partial backflow of thermal molecules. New results of this investigation will be reported.

[1]Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U.S. DOE under contract DE-AC05-00OR22725.
[2]R.H. Goulding, et al., Proc. 18th Conf on RF Power in Plasmas, Gent, Belgium, June, 2009.

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