Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Solid-State Radio Frequency Plasma Heating Using a Nonlinear Transmission Line[1] KENNETH MILLER, TIMOTHY ZIEMBA, JAMES PRAGER, ILIA SLOBODOV, Eagle Harbor Technologies, Inc. — Radio Frequency heating systems are rarely used by the small-scale validation platform experiments due to the high cost and complexity of these systems, which typically require high power gyrotrons or klystrons, associated power supplies, waveguides and vacuum systems. The cost and complexity of these systems can potentially be reduced with a nonlinear transmission line (NLTL) based system. In the past, NLTLs have lacked a high voltage driver that could produce long duration high voltage pulses with fast rise times at high pulse repetition frequency. Eagle Harbor Technologies, Inc. (EHT) has created new high voltage nanosecond pulser, which combined with NLTL technology will produce a low-cost, fully solid-state architecture for the generation of the RF frequencies (0.5 to 10 GHz) and peak power levels ($\sim$ 10 MW) necessary for plasma heating and diagnostic systems for the validation platform experiments within the fusion science community. The proposed system does not require the use of vacuum tube technology, is inherently lower cost, and is more robust than traditional high power RF heating schemes. Design details and initial bench testing results for the new RF system will be presented.

[1]This work is supported under DOE Grant # DE-SC0013747.

Timothy Ziemba
Univ of Washington

Date submitted: 24 Jul 2015 Electronic form version 1.4