Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Spatial and temporal evolution of negative ions in a pulsed inductively coupled hydrogen plasma source across a magnetic filter STUART NULTY, CORMAC CORR, Australian Natl Univ — Low-temperature electronegative plasmas have important applications in high-energy sources for fusion energy, plasma thrusters and materials processing. Neutral beam injection systems and space thruster technology such as the PEGASUS propulsion system rely on efficiently producing extractable negative ions. In this work we investigate the production of hydrogen negative ions in a pulsed inductively coupled plasma across a magnetic filter. The electron energy distribution function, plasma density and electron temperature are determined using an RF compensated Langmuir probe, and time-resolved laser photo-detachment is used to measure the negative ion fraction. The spatial and temporal evolution of these plasma parameters within the plasma source will be presented. Using a pulsed plasma and a magnetic filter, the electron temperature can be efficiently controlled and a higher density of negative ions compared to electrons can be obtained at certain locations within the source.

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Date submitted: 11 Jun 2015 Electronic form version 1.4