

Abstract Submitted  
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**Double layers in the Chi-Kung helicon source** CHRISTINE CHARLES, Australian National University — A current-free double layer (DL) spontaneously forms near the exit of the Chi-Kung helicon source at low pressure with an applied diverging magnetic field for electropositive and electronegative gases. Ion energy distribution functions measured with an energy analyser show a low divergence, accelerated ion beam downstream of the DL. The glass plate terminating the source presents some positive charging and its sheath potential, measured with a planar wall probe, is found to be greater than the DL potential drop. The energy distributions of the trapped and free electrons are measured using a rf compensated probe. Upstream of the DL the EEDF shows a very clear change in slope at energies corresponding to the double layer potential drop. Electrons with lower energy are Maxwellian with a temperature of 8 eV whereas those with higher energy have a temperature of 5 eV. The EEDF in the downstream plasma also has a temperature of 5 eV, suggesting that the downstream electrons come from upstream electrons that have sufficient energy to overcome the potential of the double layer, and that only a single upstream plasma source is required to maintain this phenomenon. Results on the transition from a non-DL plasma to a DL plasma are also presented.

Christine Charles  
Australian National University

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