

Abstract Submitted  
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**Low frequency electrostatic waves in a magnetized plasma with heavy negative ions**<sup>1</sup> SU-HYUN KIM, JOHN K. MEYER, ROBERT L. MERLINO, University of Iowa — We have observed large amplitude, low frequency (well below any cyclotron or plasma frequencies) electrostatic waves in a magnetized Q-machine plasma containing positive potassium ions (39 amu), electrons, and heavy negative ions (350 amu). The negative ions were produced by leaking  $C_7F_{14}$  (perfluoromethylcyclohexane) vapor into the Q-machine.  $C_7F_{14}$  has a large attachment rate for low energy electrons (in the Q-machine,  $T_e \approx 0.2$  eV), so that a relatively large fraction ( $n_-/n_e > 10^3$ ) of magnetized  $C_7F_{14}^-$  negative ions are formed at neutral pressures  $\approx 10^{-5}$ Torr. The waves propagate in the azimuthal direction of the cylindrical plasma column. The frequency spectrum of the waves contains narrow features at the fundamental ( $m=1$ ) and several harmonics. Possible excitation mechanisms being considered are the negative ion-modified drift instability driven by the radial density gradient, and radial shear in the azimuthal ( $\vec{E} \times \vec{B}$ ) drift velocity.

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