Low frequency electrostatic waves in a magnetized plasma with heavy negative ions\textsuperscript{1} 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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