Abstract Submitted
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Formation of a Heavy-Ion Induced ULF Cavity in the Earth's Magnetosphere[1] MANISH MITHAIWALA, NRL Plasma Physics Division, LEONID RUDAKOV, Icarus Research Inc., GURUDAS GANGULI, NRL, DENNIS PAPADOPOULOS, University of Maryland — The injection of an easily ionized vapor (lithium) from a satellite with an anisotropic and population inverted velocity distribution is highly unstable fot the spontaneous growth of ULF waves. The growth of these waves occurs near the harmonics of the lithium gyrofrequency. We show that the waves generated during this process will be trapped between two turning points forming a cavity, prolonging the lifetime of the turbulence. In the presence of a second ion species, in this case Helium, the generated waves will reflect when the frequency of the waves meets the Buchsbaum frequency. For a proton-electron-Helium plasma, with a small percentage of Helium, the Buchsbaum frequency is near the Helium cyclotron frequency. This situation where there is a turning point near the absorbtion point has been analyzed and we compute the potential loss of wave energy via tunneling. With typical percentages of Helium there is virtually no loss of wave energy. Thus as waves travel back and forth between turning points, they continue to amplify as they pass through the instability region.

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