***Abstract Title**: The Drift-Mirror Plasma Instability in Earth's inner Magnetosphere*

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ABSTRACT: The Drift-Mirror (DM) plasma instability usually requires the plasma beta (β) parameter to be $\beta > 1$. Because of this, it is difficult to study the DM instability in confined laboratory plasma experiments where usually $\beta < 1$. Therefore, space and astrophysical magnetized objects are the only environments that one can use to test theories / models, predictions, and consequences of the DM plasma instability.

We have conclusive evidence of an ultra-low frequency (ULF) wave generated by the DM plasma instability in Earth's *inner* Magnetosphere. Data analysis, from the Radiation Belt Storm Probes Ion Composition Experiment (RBSPICE) onboard NASA's Van Allen Probes Satellites, demonstrates that the DM plasma instability condition for single and multiple particle species is well satisfied. We are able to measure the wave growth rate and demonstrate, for the first time, that it agrees well with the predicted linear theory growth rate.

We also present a database summary of measurements of the plasma beta parameter in Earth's inner magnetosphere. We hypothesize that DM instability might be an important ULF wave generation mechanism in Earth's inner magnetosphere.