

Abstract Submitted
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Measurements of the Non-Linear Coupling of Plasma Waves¹ E.K. SNIPES, Wittenberg University, J. MCCLENAGHAN, A.J. NOBLE, A.A. KABANTSEV, C.F. DRISCOLL, UCSD — A separatrix is created in a pure electron plasma column by applying a θ -symmetric wall voltage. This “squeeze” voltage traps less energetic electrons in either end and allows more energetic electrons to pass through. These trapped particles enable the novel Trapped Particle Diocotron Mode (TPDM). We excite an ordinary $m = 2$ diocotron mode at frequency f_2 to amplitude A_2 and observe the decay into the $m = 1$ TPDM at $f_1 \approx f_2/2$. The exponential growth rate, Γ , of the TPDM is obtained as a function of the amplitude A_2 as well as a function of the “squeeze” voltage which determines the frequency mismatch $\delta f = f_2/2 - f_1$. We calibrate the amplitudes of the modes in terms of the received wall voltages, and obtain a quantitative value of the non-linear coupling coefficient, V . These results at $B = 280$ G will be compared to recent results² from a separate apparatus at $B > 2000$ G.

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²A.A. Kabantsev, T.M. O’Neil, Yu.A. Tsidulko, and C.F. Driscoll, Phys. Rev. Lett. **101**, 065002 (2008).

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