The Effect of Weak Collisions on the Plasma Wave Echo[1] CARRIE BLACK, KAI GERMASCHEWSKI, C.S. NG, AMITAVA BHATTACHARJEE, UNH — It has been shown recently that weak collisions, which are a singular perturbation on the collisionless Vlasov equation, have a profound effect on the underlying spectrum for linear plasma waves by eliminating the Case-Van Kampen continuous spectrum and replacing it with a complete class of discrete eigenmodes [C.S. Ng, A. Bhattacharjee, F. Skiff, Phys. Rev. Lett. **83**, 1974 (1999); **92**, 065002 (2004).]. This discovery has important consequences for the regime of validity of C. H. Su and C. Oberman's classical theory [Phys. Rev. Lett. **20**, 427 (1968)] on the collisional decay of plasma wave echoes. Using a fully nonlinear one-dimensional Vlasov-Poisson system solver including the Lenard-Bernstein collision operator, we have studied the effects of collisions on the echoes. We have identified the Su-Oberman regime on intermediate time scales. The long-time asymptotics of the system and its relation to the complete set of discrete eigenmodes found by Ng, Bhattacharjee and Skiff will be discussed.

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