## Abstract Submitted for the DPP10 Meeting of The American Physical Society

TAE-particle interaction in toroidal plasma confinement devices¹ JEFFREY PARKER, Princeton University, ROSCOE WHITE, Princeton Plasma Physics Laboratory — A model is constructed for the examination of the interaction of a spectrum of low amplitude modes with a high energy particle distribution in a toroidal plasma confinement device. It is shown that mode amplitudes and particle profiles can exhibit periodic oscillations about the mode amplitude threshold for induced stochastic transport of the particle population. The coupled system exhibits a time delay for energy transfer from the particle distribution to the mode, and for island induced collisional transport. We perform a general analysis of the coupled equations and find conditions for transition from a stable limit point to a limit cycle. An ordering of the parameters in the equations are used to examine the period and amplitude of the oscillations in the limit cycle. Analytic results are compared with with numerical integration of the equations, and with simulations of Toroidal Alfven modes interacting with beam particles.

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