

Abstract Submitted
for the TSF12 Meeting of
The American Physical Society

Overview of Spontaneous Frequency Chirping in Confined Plasmas HERBERT BERK, Institute for fusion studies, University of Texas at Austin — Spontaneous rapid frequency chirping is now a commonly observed phenomenon in plasmas with an energetic particle component. These particles typically induce so called weak instabilities, where they excite background waves that the plasma can support such as shear Alfvén waves. The explanation for this phenomenon attributes the frequency chirping to the formation of phase space structures in the form of holes and clumps. Normally a saturated mode, in the presence of background dissipation, would be expected decay after saturation as the background plasma absorbs the energy of the excited wave. However the phase space structures take an alternate route, and move to a regions of phase space that are lower energy states of the energetic particle distribution. Through the wave-resonant particle interaction, this movement is locked to the frequency observed by the wave. This phenomenon implies that alternate mechanisms for plasma relaxation need to be considered for plasma states new marginal stability. It is also possible that these chirping mechanisms can be used to advantage to externally control states of plasma.

Herbert Berk
Institute for fusion studies, University of Texas at Austin

Date submitted: 21 Sep 2012

Electronic form version 1.4