

# THE SURVIVAL THRESHOLD FOR PLASMA OSCILLATIONS

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The talk presents a complete linear theory of the classical relativistic Vlasov-Maxwell system near spatially homogeneous equilibria, which in particular includes plasma oscillations or Langmuir's waves, Landau damping, and phase mixing. Amusingly, a threshold of the wavenumber is provided for the survival of oscillations: namely, below the threshold pure oscillatory waves that obey a Klein-Gordon's type dispersion relation are found, at the threshold waves are damped by the classical Landau damping (i.e. the faster electrons decay or vanish, the weaker Landau damping is), and above the threshold waves decay exponentially via the phase mixing mechanism, the full picture of which is deeply linked to the resonant interaction between waves and particles. On the other hand, magnetic fields disperse like a Klein-Gordon wave for the full range of wavenumbers, except a kdv-type behavior at the very small spacetime frequency regime.