

Abstract For Chengdu Conference 2017

Title: Plasma Waves in Plasmas with One, Two, Three Dimensions.

C S Liu

Professor Emeritus, University of Maryland

Master Emeritus, University of Macau

Langmuir waves play important roles in plasma physics and controlled fusion research.

Even in thermal equilibrium, Langmuir waves can transport energy across magnetic field comparable to electron heat transport by collisions, because waves propagation is uninhibited by magnetic fields. Waves can transfer momentum to electrons giving rise to current drive for non inductive confinement.

Langmuir wave can interact with lasers, giving rise to Raman scattering which is a major problem for laser fusion. Langmuir wave can resonantly interact with electrons, giving rise to the wave growth or damping. Laser excitation of Langmuir wave can accelerate electrons to GEV, making the dream accelerator possible.

In two –dimensional electron gas, Langmuir wave has a different dispersion relation: its frequency is proportional to the square root of wave number. The consequent changes in its linear and nonlinear properties will be discussed.