Coherent Radiation from Plasma and a Plasma-like Medium

Abstract

Plasma, a gas of electric charges, exhibits numerous electromagnetic behaviors. One of the interesting, and fundamental properties of the plasma is the plasma oscillation. The plasma oscillation is an electron-version of the classical harmonic oscillation, but there is a major difference; the oscillating electric charges can emit electromagnetic radiations. The radiation emission from plasmas can be found universally in diverse-scale systems. In space, the fast radio-burst and type II or III emission from solar corona are famous. In the laboratory, laser-driven or beam-driven plasmas exhibit coherent radiations in millimeter and sub-millimeter (THz) spectral ranges. In this talk, a newly found mechanism of plasma emission is introduced, and comparison with other previous mechanisms is presented. Also, I discuss an expanded concept of radiation emission from general plasma-like media, which is relevant to general radiation phenomena from beam-driven or laser-driven plasma-like media, and, is also related with the radiation from plasma oscillation.