

Title: Pulsed Plasma Generator as Laboratory Source of axions or ALPs

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Abstract

An inductively coupled pulsed plasma source with an operating frequency of 29 kHz is described. Using a series resonance circuit and a diameter of 20 cm induction coils surrounding a spherical discharge vessel, a discharge plasma was produced and investigated. The achieved energy coupling efficiency between the driving circuit and the plasma is ~80% with the power peak value being more than 800 kW. Moreover, a high fraction of ionized particles, an emission spectrum in the near UV range and peak electron densities of 10^{21} m^{-3} were reached. Magnetic fields inside the plasma vessel of ~0.5 to 1 Tesla are feasible. The plasma lasts for 100 to 300 μs and the stored plasma energy is some 100J with 1kJ being envisaged. Combined with a Fabry-Perrot interferometer, this set-up is a potential source of axions or other exotica, which couple to the magnetic field.