

Tipo di tesi: Laurea magistrale

Corso di Laurea: Physics

Tipologia: sperimentale

Titolo della tesi: Atmospheric pressure RF plasma source for biomedical applications based on the helical resonator concept

Proponente: E. Martines, M. Zuin

Relatore Accademico: E. Martines

Capogruppo: E. Martines

Argomento della tesi:

The novel discipline of “plasma medicine”, concerned with the use of low power plasmas produced at atmospheric pressure for therapeutic purposes, requires the development of specific plasma sources capable of delivering the required plasma conditions. One possibility is to use radiofrequency (RF) voltage to ionize the gas. The use of RF requires, in the standard approach, a matching network to couple the generator to the load represented by the plasma source and the plasma itself when ignited, so as to minimize the reflected power. This leads to some complications in the source design and operation, which may affect the stability of the plasma properties over time, issue of great importance for treatment reproducibility. This work will explore an innovative concept, that of using a helical coil open at one end (dubbed helical resonator) as the source of the electric field required for plasma ignition, thus avoiding the matching network. Such concept has been sometimes used for low-pressure plasmas, but never for atmospheric pressure ones. The thesis work will comprise a modelling part, where all details related to the helical resonator operation, both without and with plasma load, will be explored, and an experimental one, where different types of helical resonators will be built and characterized, both without load and in their ability to ignite an atmospheric pressure plasma. The main properties of the obtained plasmas will be deduced from the electrical measurements.

Competenze richieste (se necessarie):

Data della proposta: 13 gennaio 2020

Stato: (non assegnata/assegnata): non assegnata

Laureando/a: