Resonant network antennas for plasma applications in industry

Ivo Furno[1], Riccardo Agnello[1], Philippe Guittienne[2], Alan Howling[1], Remy Jacquier[1], Gennady Plyushchev[1], Philipp Rudolf von Rohr[3]

[1] *Ecole Polytechnique Fédérale de Lausanne, Swiss Plasma Center, CH-1015 Lausanne, Switzerland*

[2]*Helyssen, Route de la Louche 31, CH-1092 Belmont-sur-Lausanne, Switzerland*

[3]*Institute of Process Engineering, Sonneggstr. 3, ETH Zurich, CH-8092 Zurich, Switzerland*

Radio-frequency resonant network antennas have recently attracted a wide interest as plasma sources and diagnostics. I will review the working principles and the applications of four novel resonant network antennas developed at the Swiss Plasma Center in Lausanne, Switzerland: 1) a planar large area source [1] (1.2x1.2 m^2) for the industrial production of solar cells, packaging, and surface treatment; 2) a cylindrical birdcage antenna [2] for helicon wave generation for negative ion production; 3) a high-pressure antenna for food and powder treatment in fluidized bed reactor processes; 4) a miniaturized (cm-size) inductive probe for plasma conductivity measurement [3] for process control and characterization.

[1] Ph. Guittienne, R. Jacquier, A. A. Howling, I. Furno, *Plasma Sources Sci. Technol.* **26**, 035010 (2017).
[2] I. Furno et al., *EPJ Web of Conferences* **157**, 03014 (2017).
[3] Patent: *"Method and Device for Determining Plasma Characteristics"*, 4 May 2015 - EP15166251.7

Email: ivo.furno@epfl.ch