

# Experimental study of inductively coupled rf plasma in a wide frequency range

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The inductively coupled (ic) rf plasma of the Ar–Hg mixture [1] was studied in a fluorescent tube in the wide frequency range from 1 up to 1000 MHz. A standard frequency for ic rf plasma sources is in the range from 0.05 up to 50 MHz [2]. Plasma was ignited by a capacitive discharge source and then was sustained by an ic rf plasma source. It is observed that plasma glow intensity in the rf coil area depends on rf generator frequency. The dependence had a number of extremes. The effect was observed in airglow discharge, but the rf generator power was not enough to maintain the plasma without a capacitive discharge source. A metal ring was studied instead of a coil. A comparative analysis was carried out between the coil and metal rings. The frequency ranges of plasma supporting for coil and rings were different. These ranges depend on the coil turn lead as well as on the distance between rings. The study was funded by the Russian Science Foundation, project No. 19-71-10055.

[1] Shen Y, Ting S, Yang L and Yuming C 2012 *Plasma Sci. Technol.* **14** 147

[2] Lieberman M A and Lichtenberg A J 1994 *Principles of Plasma Discharges and Materials Processing* (New York: John Wiley & Sons)