Title : Plasma for Microcombustion

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Research Area : Lasers and plasma physics

Methods: high-voltage probes, optical emission spectroscopy, picosecond laser spectroscopy

PhD track subject :

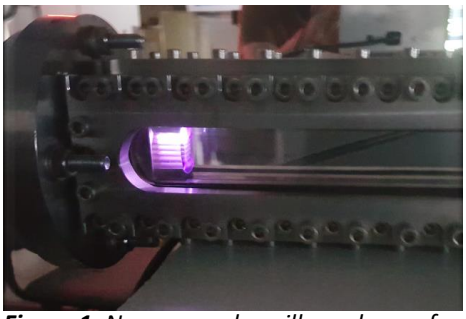

Figure 1. *Nanosecond capillary plasma for the problem of deflagration-to-detonation transition (@2021 IPP PhD Thesis, Mhedine Ali Cherif)*

Recently, research on combustion micro power generators has received significant attention due to the increasing demands for microelectromechanical systems [1]. Thermal and radical quenching at the walls decrease flame stability in microcombustors. Nonequilibrium plasma is a promising tool for flame stabilization [2]. Production of radicals, fast gas heating and use of catalyst provide an opportunity to increase the stability of combustion on a microscale. The goal of PhD study is to develop the approach allowing stable microcombustion with the use of plasma/catalyst.

References:

[1] B. Aravinda, B. Khandelwal, P.A. Ramakrishna, S. Kumar, 2020, Towards the development of a high power density, high efficiency, micro power generator, Applied Energy 261, 114386

[2] S.M.Starikovskaia, 2014, Plasma-assisted ignition and combustion: nanosecond discharges and development of kinetic mechanisms, J. Phys. D: Appl. Phys. 47, 353001