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# Experimental caracterization of non-premixed Hydrogen-Oxygen flames by LDV and Tomography measurements

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## ABSTRACT

Velocity measurements and laser tomography visualization are performed for non-premixed flames stabilized on a coaxial injector. The aim of this study is to analyse the flame/turbulence interaction in the case of high speed flows. In this way, the study of hydrogen/oxygen flames characterized by an important heat release and a high Dämkholer number, are of great interest since the flame/turbulence interaction are accentuated in comparison with other flames. Furthermore, the flow rates have been calculated to approach conditions similar to those of rocket engine with an important hydrogen excess and velocity ratio. Two optical diagnostic methods have been used to characterize the scalar and the dynamic structure of the flow field. Laser tomography is applied to visualize the flame location and two-components Laser Doppler Velocimetry (LDV) measurements is performed on flames to obtain velocity flow field.

The flow field structure of each flame was investigated by performing Laser Doppler Velocimetry (LDV) measurements. This flame produces a high temperature level ( 3000K ) and high flow velocity. The combination of this two conditions makes LDV measurements very complicate and increases the uncertainties of the experimental results. The flow seeding and the bias problems were simultaneously studied in this work. Laser tomography was also applied to visualize the flame location and to determine the global flame zone structure and the fresh gases inside the area within the conical flame