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EXPERIMENTAL STUDY OF FLAME-WALL INTERACTION BY PARTICLE IMAGING VELOCIMETRY TECHNIQUE

Fabrice Foucher, Serge Burnel, Pascal Higelin, Christine Mounaï m-Rousselle
Laboratoire de Mécanique et d'Energétique
E.S.E.M. / Université d'Orléans
45072 Orléans cédex 2, France

ABSTRACT

In many industrial combustion chambers, the flame-wall interaction is still a relevant research subject owing to the fact that this complex phenomenon can induce high HC emissions. In the case of I.C. engines, it seems to be interesting to get new experimental data about flame quenching and local stretch rate effect on the flame. For that, we have decided to develop an experimental set-up which allows to be on head-on quenching configuration as in real case. By using Tomographic Particle Imaging Velocimetry and with the development of new algorithms, the determination of different quantities such as flame velocity, reactant one and flame speed versus different stretch cases is available. Therefore the aim of this paper is to criticise and to propose different methods to estimate as well as possible the local flame speed. For that, our method was firstly tested on simplified cases : spherical propagation or analytically generated flame front. Finally, it was applied on our configuration where the approach of the wall give rise to strong local curvatures and velocity gradients.