

Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Premixed laminar flame propagation in a rotating vessel¹ TERESA PARRA, University of Valladolid, ANDRZEJ GORCZAKOWSKI, Technical University of Lodz, JERZY CHOMIAK, Chalmers University of Technology, JOZEF JAROSINSKI, Technical University of Lodz — Combustion in a swirling flow is devoted to burn lean mixture in spark ignition engines since it provides fuel economy and exhaust emission reduction. Therefore it is important to know the flame behavior under centrifugal forces. The flame in a rotating gas is modified by an aerodynamic mechanism due to action of centrifugal forces instead the laminar burning velocity due to chemical kinetics. The paper deals with important characteristics of eddy combustion mechanism such as: flame shape and propagation as a function of the rotation rate. Therefore pictures captured by a video camera are treated with the image processing toolbox from Matlab in order to establish the main characteristics of the flame kernel of a mixture propane – air at different rotation rates ranging from 500 to 4000 rpm. It is observed that the flame propagates along the rotation axis and that the extinguishing of the flame is involved with the heat losses as soon the flame reaches the wall of the chamber. In addition, the flame shape is quite similar to the intrusion head of a light fluid penetrating into a stagnated heavy fluid.

¹This work was sponsored by Marie Curie TOK (No MTKD-CT-2004-509847) and Castilla y Leon Region (VA028A08).

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Date submitted: 02 Aug 2008

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