

『学長裁量経費による海外研究者
招聘助成』プログラム

Seminar



at L0031, Lecture Hall Bldg. for the Faculty of Engineering
August 13th 2019, 13:30 - 14:30



Title

Dynamics of a reactive gaseous interface: Use of complex poles to describe the nonlinear evolution

Dr. Christophe Almarcha

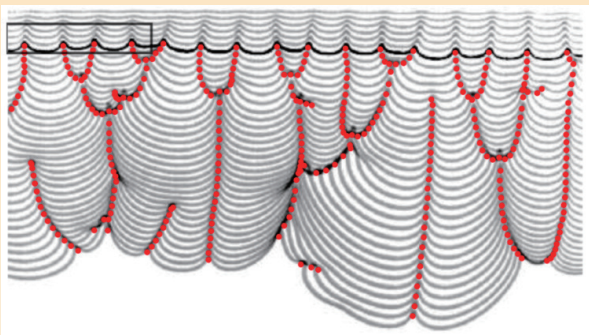
Associate Professor, Aix Marseille University, France

言語/英語
Language/English

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Everyone is welcome
to attend.

Abstract

A premixed flame is a sub-millimeter interface through which a mixture of reacting gas is transforming into burned gas with an increase in temperature and molar volume by a factor 8. This is due to the global exothermicity of hundreds of chemical reactions at play. The gas expansion at the reactive interface induces hydrodynamical instabilities that are wrinkling the interface in a complex dynamics. Some cells are forming and merging in a fashion similar to bubbles in Rayleigh-Taylor instability. However, contrary to that instability, the propagation of the flame induces a limitation of the wrinkling amplitude and it is then possible to describe the evolution of the interface with a PDE equation: the Michelson-Sivashinsky equation. Moreover some analytical solutions consisting of pole trajectories in the complex plane are capable of describing all the dynamics, even in the fully nonlinear regime. This is what we demonstrate experimentally in a quasi-2D burner.



Almarcha et al. "Interface dynamics, pole trajectories, and cell size statistics"
Phys. Rev. E 98, 030202(R) (2018)

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