au programme des séminaires ICARE…

Kinetic and Gasdynamic Aspects of DDT in Different Geometries

par

Pr. Mikhail KUZNETSOV

Group leader for hydrogen explosion experiments,
Institute for Nuclear and Energy Technologies,
Karlsruhe Institute of Technology, Germany

le mercredi 10 juillet 2013 à 10h30
salle de réunion ICARE

The problem of the deflagration-to-detonation transition (DDT) and a key role of shock waves, boundary layer and turbulence in the detonation preconditioning process is well known but still not resolved in the combustion theory. The ignition, flame propagation with flow ahead of the flame, shock waves generation with turbulent boundary layer behind the shock is the sequence of principal events leading to the deflagration-to-detonation transition in smooth channels.

An overview of DDT phenomena in linear (1D), planar (2D) and torus geometries will be presented in current work in order to demonstrate an effects of gasdynamics and kinetics on the detonation onset. A specific effect of geometry connected with boundary layer phenomena and shock-flame interaction will also be analyzed. It will also be demonstrated that detonation preconditioning history, starting from the ignition, plays an important role on the success of the detonation transition. For instance, a recently developed concept of shockless flame acceleration and detonation transition will for the first time be presented. An effect of turbulence and different instabilities on flame acceleration with respect to detonation preconditioning will be considered in this talk. An importance of detailed chemistry on reliability of DDT theory and numerical simulations will be shown. The main idea of this talk is to accumulate still unresolved key aspects of the DDT mechanism to be analyzed experimentally and theoretically for the nearest future.

Pour tout renseignement complémentaire, ou proposition de séminaire par un thésard ou un chercheur invité, contacter Ivan Fedioun, fedioun@cnrs-orleans.fr, poste 5520, 06.62.81.23.08