特別講演会のお知らせ

燃焼・エネルギー問題についての最新トピックについて，特別講演会を企画させていただきました．ここにご案内申し上げます．

ひとつ目は，火炎のダイナミクスの理論解析を専門とするロシア科学アカデミーの Sergey Minaev 先生によるご講演です．本講演会では，火炎の流体力学的不安定性に関する最新の理論研究についてご講演いただきます．

ふたつ目は，数値計算による火炎動態の解析を専門とするロシア科学アカデミーの Roman Fursenko 博士によるご講演です．最新の GPU による並列計算を用いた火炎球の動態に関する三次元数値計算についてご講演いただきます．

ご都合により，どちらか片方の受講も大歓迎いたします．皆様のご参加をお待ちしております．

流体研　丸田　薫・中村　寿

記

日時：平成 22 年 10 月 22 日(金)　14:00～15:00
場所：流体科学研究所　COE 棟　3 階　セミナー室

講演１　14:00～14:30
講師：Prof. Sergey Minaev (SB, RAS)
題目：NOISE INFLUENCE ON HYDRODYNAMICALLY UNSTABLE PLANAR AND OUTWARD PROPAGATING FLAMES
要旨：
Dynamics of planar and outward propagating cylindrical flames has been studied in terms of exact solutions of the Sivashinsky equation with a random force term. The force term models the computational round-off errors or a variety of perturbations of physical origins, for example, perturbations caused by inert particles seeded in gas. In contrast to noiseless conditions, the number of poles in the system does not conserve and new poles appear due to the external forcing. Investigations based on the pole solutions make possible to exclude the uncontrolled numerical noise that is ever presented in direct computations of the Sivashinsky equation and examine the interplay between noises and the hydrodynamic instability. The study clearly demonstrates that the presence of noises is a necessary condition for the flame acceleration. The perpective statements of new theoretical problems directed towards of modelling of hydrodynamically unstable flames are discussed.

講演２　14:30～15:00
講師：Dr. Roman Fursenko (SB, RAS)
題目：Parallel Computations on the Base of GPU for Modeling of Flame Balls Dynamics
要旨：
A 3D reaction-diffusion model for lean premixed flames with radiative heat losses propagating in

divergent channel is studied numerically.
Parallel computations on the base of GPU allow us to reach 40 times speedup in comparison with computations on CPU. Effect of inlet gas velocity and heat-loss rate on flame structure at low Lewis number is investigated. It is shown that the flame represented by the continuous flame front at small heat losses and by the separate flame balls at large heat losses is localized inside the divergent channel in wide range of problem parameters.

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