

特別講義のご案内

Combustion • Physical and Chemical Fundamentals,
Modeling and Simulation, Experiments, Pollutant Formation

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日時 2012年1月18日(水) 3限(13:00-14:30)

場所 A306 教室

Dibble 先生は乱流反応性流れ内のレーザー計測, グリーン燃料(バイオエタノール及びバイオディーゼル燃料), 燃焼機器の熱効率向上及び環境負荷低減技術, HCCI 燃焼などを御専門とされ, 国際燃焼シンポジウム, Combustion and Flame 等で多数の論文発表をされている著名な先生です。相澤の留学先(1995~96年)の研究室の指導教官をされており, 2012年1月12日から22日までの10日間の日程で明治大学理工学部に滞在される予定です。講義は参加自由で、英語で実施されます。ユーモア溢れるユニークなお話をして頂けるものと思いますので、お気軽に御参加下さい。

Combustion is the oldest technology of mankind: it has been used for more than one million years. At present, about 90% of our worldwide energy support (e. g., in traffic, electrical power generation, heating) is provided by combustion; therefore it is really worthwhile studying this process.

Combustion research in the past was directed to fluid mechanics that included global heat release by chemical reaction. This heat release was often described simply with the help of thermodynamics, which assumes infinitely fast chemical reaction. This approach was useful to some extent for designing stationary combustion processes; it is not sufficient for treating transient processes like ignition and quenching or if pollutant formation shall be treated. However, pollutant formation during combustion of fossil fuels is, and will continue to be, a central topic in the future.

The focus of this lecture is therefore to treat the coupling of chemical reaction and fluid flow: in addition, combustion-specific topics of chemistry (hydrocarbon oxidation, large reaction mechanisms, simplification of reaction mechanisms) and combustion-specific topics of fluid mechanics (turbulent flow with density change by heat release, potential generation of turbulence by heat release) shall be considered.

コーディネータ 相澤哲哉 (機械情報工学科 専任講師)