Preliminary Program

Lean Combustion Technology II: Promise and Practice

April 25-29, 2004

Hotel dos Templários
Tomar, Portugal

Conference Chair

Derek Dunn-Rankin
University of California, USA

Conference Co-Chairs

Robert K. Cheng
Lawrence Berkeley National Laboratory, USA

Masashi Katsuki
Osaka University, Japan

Chris Sheppard
The University of Leeds, UK

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Sunday, April 25, 2004

17:00 -- 18:00	Registration
18:00 -- 20:00	Reception
20:00	Dinner

Monday, April 26, 2004

07:00 -- 08:30	Breakfast

OPENING OF CONFERENCE

08:30 -- 08:45	Welcome Remarks / conference concept -- setting the stage Conference Chair ECI Liaison

NEW PERSPECTIVES ON LEAN COMBUSTION (all technologies)

08:45 -- 09:15	*Lean Combustion: Power Generation Cycles and Fuels* Derek Bradley, Leeds University
09:15 -- 09:30	*Follow-up brief -- Extinction Mechanisms in Lean Flames* Tadao Takeno, Meijo University
09:30 -- 09:45	*Questions / Discussion* Chris Lawn, Queen Mary, University of London
09:45 -- 10:15	*Advances in Alternative Energy and Environmental Policy* Manuel Heitor, Center for Innovation, Technology and Policy Research, Instituto Superior Tecnico, Technical University of Lisbon
10:15 -- 10:30	*Follow-up brief -- Drivers for Novel Lean Burn Technologies* Robert Cheng, Lawrence Berkeley Laboratory
10:30 -- 10:45	*Questions / Discussion* TBD
10:45 -- 11:15	Coffee Break / Informal Discussion
11:15 -- 11:45	*Modeling -- RANS versus Large Eddy Simulation for Lean Combustion* Bill Jones, Imperial College London
11:45 -- 12:00	*Follow up brief -- DNS and Modeling of Turbulent Premixed Flames* Tatsuya Hasegawa, Nagoya University
12:00 -- 12:15	*Questions / Discussion* John Bell, Lawrence Berkeley Laboratory
12:15 -- 12:45	Break
12:45 -- 14:00	Lunch

14:00 -- 17:30	Informal discussion / free time
17:30 -- 18:00	Refreshments
18:00 -- 18:30	*Hydrogen Fuel and Lean Combustion* Joseph Oefelein, Hydrogen Program, Sandia National Laboratories, Livermore
18:30 -- 18:45	Follow up brief -- *TBD*
18:45 -- 19:00	Questions / Discussion
19:00 -- 20:00	Poster Introductions -- 5-10 minute presentations with authors introducing their poster papers from Poster Session I
20:00	Dinner
21:00	Social Hour and Informal Discussions

Tuesday, April 27, 2004

07:00 -- 08:45	Breakfast

LEAN COMBUSTION TECHNOLOGIES

09:00 -- 10:30	**IC Engines** Discussion Leader – Chris Sheppard, Leeds University
	CFD Simulation of IC-Engine Lean Burn Combustion – Current Capabilities and Future Developments Reinhard Tatschl, Advanced Simulation Technologies, AVL
	Recent Developments in Lean-Burn IC Engines Robert Evans, University of British Columbia
	The Potential for HCCI Combustion for High Efficiency Low-NOx Engines Dan Flowers, Lawrence Livermore National Laboratory
10:30 -- 11:00	Coffee Break
	HCCI: Diagnostics and Control Bengt Johansson, Lund Institute of Technology
	Diesel Alternatives for the coming Automotive Emissions Legislation Scenario Silvio Canale, Fiat Research Centre
12:00 -- 13:30	Lunch
13:30 -- 15:30	**Gas Turbine Engines** Discussion Leader -- Vince McDonell, Advanced Power and Energy Program, University of California, Irvine
	Lean-staged Pyrospin Combustor for next Generation APU

Daih-Yeou Chen, Hamilton Sundstrand

Lean Premixed Combustion Technology Applied to Demag Delaval's Gas Turbines - present status and future challenges
Khawar Syed, Demag Delaval Industrial Turbomachinery Ltd.

Title TBD –
Kevin Menzies, Rolls Royce

Advanced Fuel Injection Strategies for Lean Direct and Lean Premixed Gas Turbine Combustion
Adel Mansour, Parker Hannifin

15:30 -- 16:00 Coffee Break

16:00 -- 17:15 **High Preheat and Heat Recirculating Systems** -- Discussion Leader -- Masashi Katsuki, Osaka University

Design of Small Scale Heat Recirculating Burners
Lars Sitzki, University of Southern California and Fluent

Mild Diffusion-Ignition Lean Premixed Combustion
M. de Joannon, A. Cavaliere, Università Federico II, Napoli

17:15 -- 18:45 **Burner Concepts** -- Discussion Leader -- Howard Levinsky, Gasunie

The Application of Radiant Burners in the Gas Heating Industry
Massimo Dotti (with co-authors -- Gunther Berthold, Luca Barozzi, Stephan Wijkmans, Enrica Baraldi, Massimo Giglioli, Sandro Lugli, Wenzel Mach), Worgas Bruciatori

Catalytic Combustion
Robert Dibble, University of California, Berkeley

Miniature Catalytic Combustors
Yei Chin Chao, National Cheng Kung University, Taiwan

19:00 -- 20:30 Dinner

20:30 -- 22:30 **Poster Session I and Informal Discussions: Fundamentals and novel concepts**

The Physical Modeling of Lean Extinction Limits in Premixed Swirl Flames
Chris Lawn, Queen Mary, University of London

Numerical Simulation of Combustion of Multiphase Flows in the Atmosphere
S.V. Utyuzhnikov, Moscow Institute of Physics and Technology

Flame Characteristics of Lean Premixed Methane/Air Flames
P. Griebel, Paul Scherrer Institute

The Influences of Preheat Temperature and Mixture Compositions on Combustion Regime
Chul-Ju Ahn and Masashi Katsuki, Osaka University

Experimental and Numerical Investigation of the Hydrogen-Assisted Catalytic Ignition of Methane
Yei-Chin Chao, National Cheng Kung University

Experimental Study on the Pilot Flame Anchored Premixed Flame in a Tube
Young Tae Guahk, KAIST

Experimental Study of Stratified Lean Flames Stabilized by Swirl in Intense Isotropic Turbulence
Alessio Bonaldo, Cranfield University

The Design of Sound Probes for Unsteady Combustion Studies
Edgar Fernandes, Instituto Superior Tecnico-DEM/SAE

Optical Determination of Equivalence Ratio in Premixed Laminar Flames – The Effect of Different Surrounding Gaseous Atmospheres
Teodoro Trindade, Instituto Superior de Engenharia de Lisboa-DEQ

NO Formation for Diesel Engines
J.E. Labs and T. Parker, Colorado School of Mines

Wednesday, April 28, 2004

07:00 -- 08:30 Breakfast

CONTROLLING LEAN COMBUSTION

08:30 -- 09:00 *Practical Control Strategies for Lean Combustion*
Ben Zinn, Georgia Institute of Technology

09:00 -- 09:15 Follow up brief -- *Title TBD*
Ahmed Ghoneim, Massachusetts Institute of Technology

09:15 -- 09:30 Questions / Discussion -- TBD

09:30 -- 10:00 *Models versus Experiments in the ONR Lean Combustion Projects*
Gabriel Roy, Office of Naval Research

10:00 -- 10:15 Follow up -- *Title TBD*
Koichi Hayashi, Aoyama Gakuin University

10:15 -- 10:30 Questions / Discussion
Edgar Fernandes, Instituto Superior Tecnico-DEM/SAE

10:30 -- 11:00 Coffee Break

11:00 -- 11:30 *Sensors and Diagnostics*
Doug Greenhalgh, Cranfield University

11:30 -- 11:45 Follow up -- *Title TBD*
Houston Miller, George Washington University

11:45 -- 12:00	Questions / Discussion Mark Allen, PSI Corporation
12:00 -- 13:30	Poster Introductions -- 5-10 minute introductions of posters in Poster Session II
13:30 -- 14:30	Lunch
14:30 -- 19:00	Optional Excursion -- Possibilities include Fatima, Obidos, Roman Ruins, nearby wineries
19:00 – 20:00	Dinner
20:00	**Poster Session II and Informal Discussion: Modeling, diagnostics, and comparisons to experiments**

The Effect of Mixing of Core and Annular Flows of Premixed Gaseous Fuels and Air on Combustion Oscillations and Control
D.S. Luff and J.H. Whitelaw, Imperial College London

Combustion Dynamics of Premixed Inverted Conical Swirling Flames
A.L. Birbaud, Laboratoire EM2C CNRS/ECP

The Effects of Equivalence-Ratio Oscillation on Lean Stability in the Impingement Flame
Yao-Wei Huang and Yei-Chin Chao, National Cheng Kung University

PVC Dynamics in a Model Lean-Premixed Combustor
Sergei Shtork, Instituto Superior Technico-DEM/IN

Three-Dimensional Computerized Tomographic Reconstruction of Instantaneous Distribution of Emission Intensity in Turbulent Premixed Flames
Yojiro Ishino, Nagoya Institute of Technology

Control of Combustion Oscillations and Lean Blowout Prevention based on Local Flame Structure
Mamoro Tanahashi, Information Technology Center, Japan Aerospace Exploration Agency

CFD Modelling of a Multiple Injection System in DI Diesel Engine
C. Shanmugasundaram and N.V. Mahalakshmi, Anna University

Effect of Injection Rate Control in a HSDI Diesel Engine
A.S. Herman, Indian Institute of Technology, Madras

Performance of Low Heat Rejection Diesel Engine and Combustion Analysis using different Heat Transfer Models
A.N. Panwar, Government Polytechnic, Yavatmal

Spectrum Analysis of Chemiluminescence in HCCI Combustion with Dimethyl Ether
Nobuyuki Kawahara, Okayama University

Diluted and Stoichiometric Combustion of Dual Fuel (Methane and Gas Oil) Engine with HCCI Concept
Eiji Tomita, Okayama University

The Difference between HCCI and Lean Burn Gasoline Engines
Teruyuki Itoh, Nissan Research Center

Experimental Investigation of Lean Flames Exposed to Acoustic Forcing
Adam Ruggles, Cranfield University

A Comparison of PDA and LSD Data in an Evaporating GDI Spray
T. Réveillé, G. Sherwood, M. Buchberger, R. Eigenschenk, M. Hartmann, M. Schenk, P. Steil, and D.A. Greenhalgh, Cranfield University and BMW Powertrain Development

Simulation of the Power Cycle of Hydrogen Fuelled SI Engines
Roger Sierens and Sebastian Verhelst, University of Gent

Thursday, April 29, 2004

07:00 -- 08:45 Breakfast

ISSUES IN A LEAN COMBUSTION FUTURE

09:00 -- 09:30 *Modelling Challenges -- LES Modeling of Turbulent Premixed Combustion*
Christer Fureby, Grindsjön Research Center

09:30 -- 09:45 Follow up -- *Low Mach Number Simulation of Turbulent Premixed Combustion*
John Bell, Lawrence Berkeley National Laboratory

09:45 -- 10:00 Questions / Discussion
Robert Cheng, Lawrence Berkeley Laboratory

10:00 -- 10:30 *Hydrogen Fueled SI Engines: Experimental Results*
Roger Sierens, University of Gent

10:30 -- 10:45 Follow up comment

10:45 -- 11:00 Questions / Discussion

11:00 -- 11:30 Coffee Break

CONFERENCE RECAP

11:30 -- 11:50 *Fundamental Barriers* -- Session Chairs

11:50 -- 12:10 *Diagnostics and Modelling* -- Session Chairs

12:10 -- 12:30 *Technology Advances: Engines and Burners* -- Session Chairs

12:30 -- 13:00 Break

13:00 Reception and Conference Luncheon Banquet

14:30 Closing Remarks / Combustion Treatise Volume

15:00	Conference Closes