



**IEA Combustion Agreement  
28<sup>th</sup> Task Leaders Meeting  
August 13 – 15 2006 in Heidelberg**

# **International Energy Agency Implementing Agreement on Energy Conservation and Emissions Reduction in Combustion**

## **Collaborative Research Activity on Sprays in Combustion**



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Internal Combustion Engine Laboratory



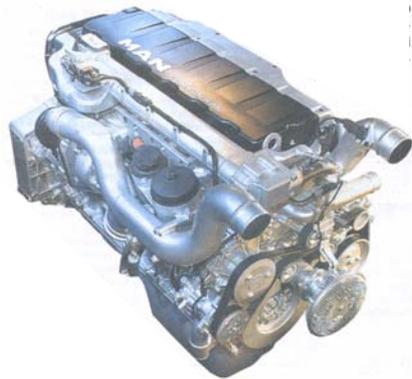
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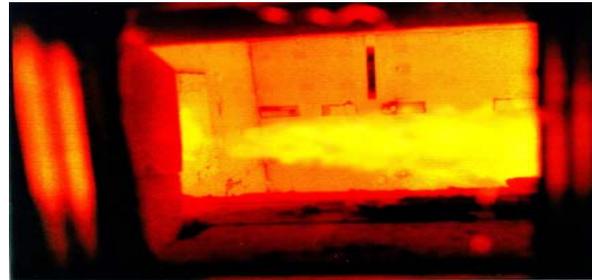


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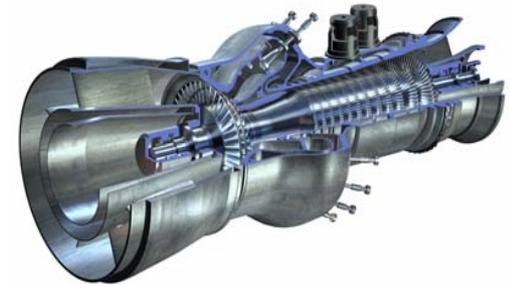
## Applications of sprays in combustion



Internal Combustion Engines



Furnaces & Boilers



Gas Turbines



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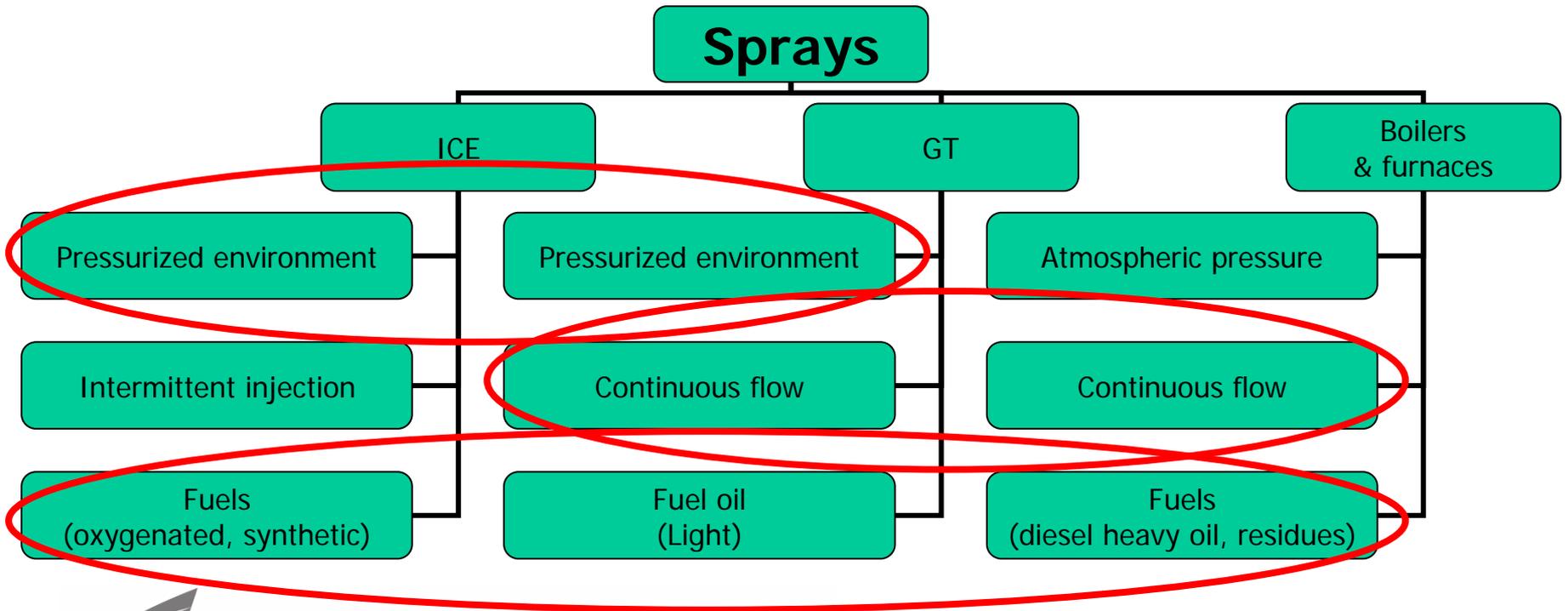


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# Experiments/Modeling of sprays in combustion





## A multitude of issues in spray research

1. Spray formation and spray global properties:  
drop penetration, vapor penetration, spray angle, fuel mass distribution, spray interaction with flow field, air entrainment in the spray, etc.
2. Spray local properties: drop size, drop size distribution, drop velocity, etc.
3. Sprays in different environments:  
evaporating / non-evaporating conditions, inert / reactive conditions;  
constant volume / real engine environmen, . continuous / intermittent flow
4. Spray properties vs. fuel physical properties.
5. Spray properties vs. injector and nozzle flow.
6. Spray physical phenomena: drop breakup, drop evaporation, coalescence, interaction with the flow-field, nozzle flow vs. drop breakup etc.
7. Spray measurement techniques





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## **The objective is to have an spray research network and a common focus:**

### **Proposal for focal areas**

1. Experimental characterization of sprays and the build up of an international spray data database.
2. Spray physical phenomena:  
advance modeling of (dense) sprays  
with (a later expansion to) evaporating/reactive conditions  
'LES modeling of sprays'



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## Individuals (having expressed interest)

- Bob Gallagher
- Lyle Pickett
- Peter Jansohn
- Jin Kusaka
- Tomio Obokata
- Masanobu Maeda
- Yasuo Moriyoshi
- H. Gen Fujimoto
- Konstantinos Boulouchos
- Gerardo Valentino
- Doug Greenhaugh
- Norihiko Iki
- Philippe Ngendakumana
- Martti Larmi
- Gurpreet Singh
- Felice Corcione





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**Want to join the club ?**

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