

Modeling Engine Compression Ignition Combustion using Ducted Fuel Injection Technology and Alternative Fuels

Tommaso Lucchini¹, Andrea Schirru¹, Qiyang Zhou¹, and Gianluca D'Errico¹

¹*ICE Group, Department of Energy, Politecnico di Milano*

Reducing pollutant and GHG emissions for the *hard-to-abate* sectors (maritime and long-haul transport, off-road applications, power generation) requires further improvements to compression-ignition combustion technology and the use of low carbon fuels. This presentation illustrates recent developments and applications of the LibICE code, based on the OpenFOAM technology, which are intended to provide reliable and predictive approaches for the simulation of the new emergent CI combustion technologies such as:

- Tabulated kinetics for Ducted Fuel Injection (DFI) combustion
- Modeling DME engine combustion using Representative Interactive Flamelet Model and tabulated kinetics
- High Pressure Dual Fuel (HPDF) combustion using tabulated kinetics

Modeling approaches will be presented together with validation with data from constant volume vessel and engine experiments.