

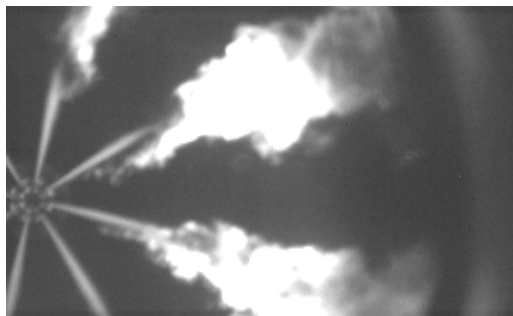
Optical diagnostics in combustion: Bunsen flame and diesel engine

R.J.H. Klein-Douwel

*Combustion Technology/Internal Combustion Engines
Eindhoven University of Technology*

Combustion pervades our daily life and its effects have been utilised since ancient times. Nowadays many people depend on combustion processes for their heating, cooking and transport. Despite the current understanding of these processes, more detailed knowledge is necessary. For instance, validation of models will allow them to be used to predict combustion behaviour under various circumstances and detection of pollutant species at the source, instead of only in the exhaust, may lead to insight of how to reduce emission of those species.

Optical methods are (almost) non-intrusive and can be highly selective. They are therefore often used in combustion diagnostics. In the presentation two examples will be discussed. The first concerns laser-induced fluorescence of CH in a Bunsen flame, representative of a domestic appliance. CH is a flame front marker and plays an important role in the formation of NO, a pollutant species. The second example concerns the combustion process inside a heavy duty diesel engine, similar to the ones crowding modern highways. A high-speed camera is used to visualise the fuel injection and its subsequent combustion. A more detailed look is offered at the presence of NO by using cycle and spatially resolved laser-induced fluorescence. These signals can be quantified by separate exhaust measurements.



*Single frame of a high speed movie recorded in a heavy duty diesel engine.
Exposure time is 27 μ s.*