Special issue: laser diagnostics in combustion

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Combustion, as the dominating energy conversion process in our society, can benefit from further improvements to increase efficiency, reduce pollutant emissions, and enable the use of non-traditional fuels. This challenge is supported substantially by laser diagnostics providing detailed insights into the underlying physical and chemical processes. In recognition of laser diagnostics as a key technology, this special issue on *Laser Diagnostics in Combustion* intends to highlight the recent developments and provide an overview of the current state-of-the-art.

The guest editors would like to dedicate this special issue of Experiments in Fluids to Prof. Jürgen Wolfrum of the University of Heidelberg on the occasion of his 70th birthday to recognize his many contributions to the field of combustion research over the past 40 years and for the development of advanced optical diagnostics tools. These tools are essential to increase our understanding of the intricate and complex non-linear couplings of physical and chemical processes in combustion. The rapid development of lasers and detectors in the past decades has dramatically changed the way we can study combustion processes. The

high temporal resolution, species-specific excitation, and micrometer-sized spatial resolution allow measurements of individual reaction rates, concentration and temperature profiles in well-defined laminar flames to develop and test chemical kinetic models, and the nature of turbulence-chemistry and chemistry-surface interactions. Advances in instrumentation have also enabled non-intrusive measurements in industrial environments not only to investigate technical devices such as internal combustion engines and gas turbines but also as sensors integrated for control purposes in large-scale power plants.

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