

Laser diagnostics in turbulent sooting flames

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ABSTRACT

Over past few years, several laser diagnostic techniques used for the measurements of lab-scale turbulent sooting flames have been developed and applied in the combustion group of the University of Adelaide. In this talk, the details of these unique technique will be reviewed, particularly focusing on the technical details. In addition, this talk will highlight the novel, but relatively simple, methods we used to overcome the challenges in the application of laser techniques in turbulent sooting flames due to the presence of nano-carbon particles and high radiation. The laser techniques include those used for the measurements of several key parameters, e.g., flame temperature, soot volume fraction, primary particle diameter, velocity and polycyclic aromatic hydrocarbons. In this talk, I will also introduce a new optical method to diagnose larger scale sooting flames, e.g. big fire, to understand the formation of black carbon particles (i.e. smoke) with a long residence time.