

On the Combustion of Liquid Fuels: Droplets Vaporization and Combustion under Engine Conditions

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The performance of liquid-fuelled spray combustion systems has a massive impact on the efficiency and unwanted emissions of energy production in many sectors across the globe. Realistic combustors generate sprays with sub 100- μm droplets and operate under high pressure and temperature in turbulent environments. Investigations into single droplet evaporation and combustion help provide fundamental knowledge and validation data regarding the performance of spray combustion, and although single droplet approaches have been a staple of energy research for many decades, there is still little information at conditions pertaining to those encountered in engines. This is particularly the case concerning the effect of turbulence and droplets initial diameter, especially micro-sized, on the evaporation and combustion processes. This seminar highlights some recent research studies carried out at the University of Manitoba with the aim to further advance our knowledge of this topic that is fundamental for improving liquid-fuelled combustion technology.

