

# Diode Laser Diagnostics for Reactive Aerosols

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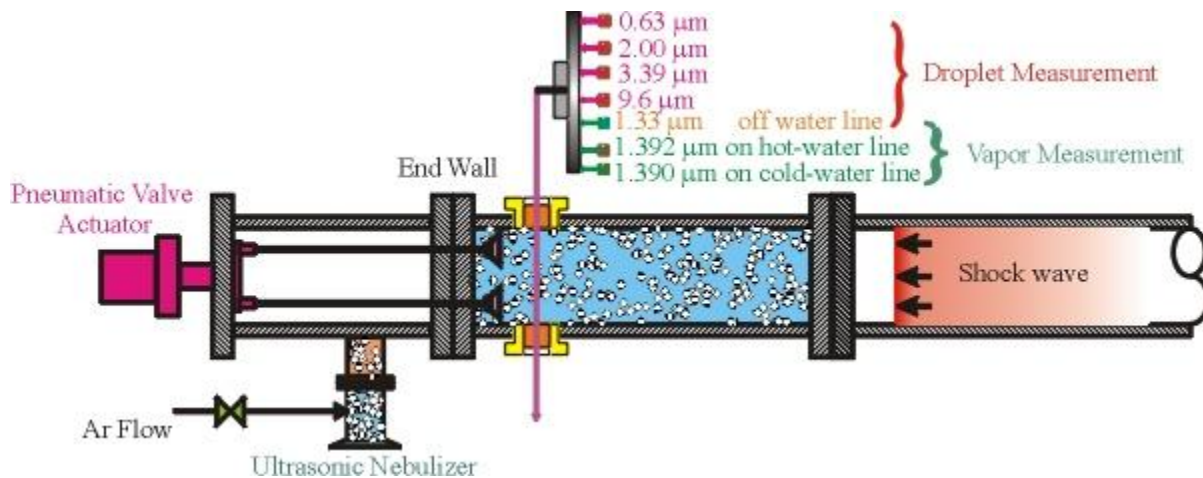
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## Overview

Beginning with a fog consisting of some fuel, say decane, at room temperature, a shock wave will compress, heat, and completely evaporate the droplets in fewer than 100 microseconds. Fast diagnostics are clearly essential to measure the properties of these mixtures. We recognize the temperature, pressure, and particle size distribution as the most important properties to measure.

By using information from three, closely-spaced diode laser sources near 1.35  $\mu\text{m}$ , we are able to measure the temperature of the gas phase in the presence of droplets. The temperature is inferred by measuring water vapor absorption at two of the colors. The third color is non-resonant and accounts for the effects of particle scattering. A typical setup is schematically illustrated below.



**Figure 1: Schematic of test setup**