OH* CHEMILUMINESCENCE IMAGING USING THE TSI® PLIF SYSTEM

APPLICATION NOTE PLIF-005 (US)

Introduction

The characterization of direct injection diesel combustion is important for a variety of current research topics. The following application note describes measurements of OH* chemiluminescence performed using the TSI planar laser induced fluorescence (PLIF) measurement system.

Experimental Setup

Figure 1 shows a schematic of the experimental setup as seen from above. The diesel injector is shown on the left side. An optical window ring allowed for introduction of the laser sheet. A 45° mirror and a quartz window in the piston allowed for the proper viewing angle of the camera.

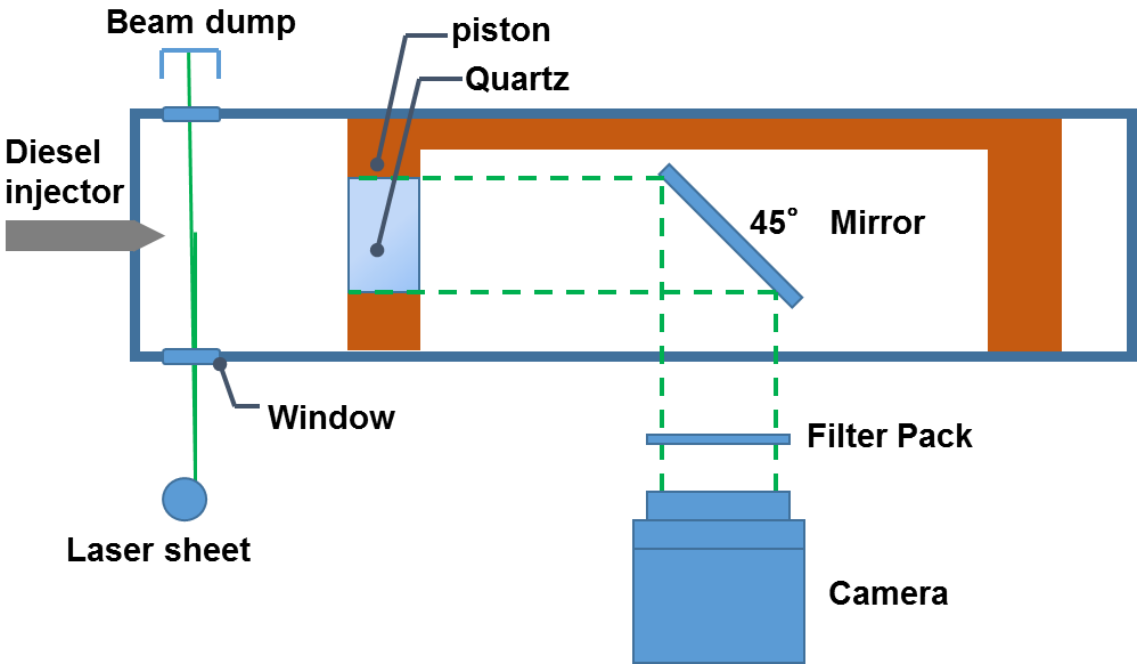

Fig. 1. Schematic of the experimental setup

Results

Figure 2 shows a set of raw images taken at a frame rate of 20,000 Hz, with every 4th frame shown, for clarity. The OH signal was centered on 313 nm.

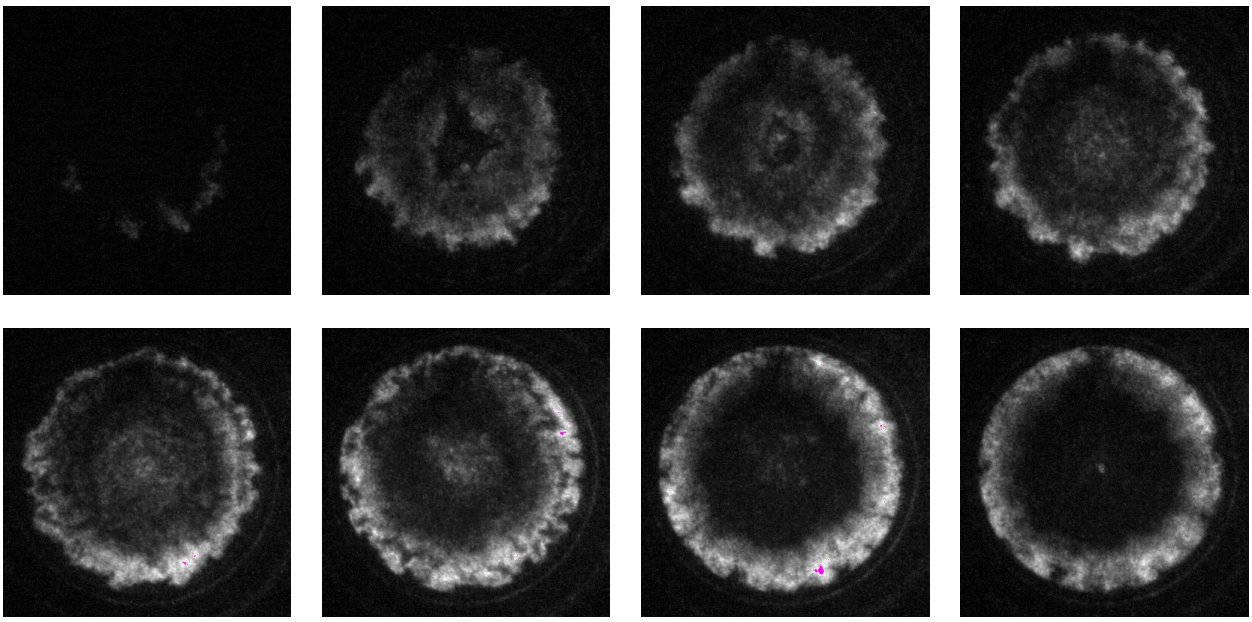

Fig. 2. Raw images at multiple times after start of ignition (ASI), from top left to bottom right, 0.0ms, 0.2ms, 0.4ms, 0.6ms, 0.8ms, 1.0ms, 1.2ms, and 1.4ms.

Acknowledgements

Measurements courtesy of Prof. Sundar Krishnan and Prof. Kalyan Srinivasan, Energy Institute, ME Department, and CAVS, Mississippi State University.

Reference

Krishnan S, Srinivasan K, Stegmeir M (2015) "Characterization of Diesel Combustion in a Rapid Compression-Expansion Machine using OH* Chemiluminescence Imaging," *68th APS DFD Meeting*, *Boston, MA, Nov 21-23, 2015.*