

Time-Resolved X-Ray Radiography of Diesel Injectors from the Engine Combustion Network

A. L. Kastengren, F. Z. Tilocco, D. Duke, C. F. Powell, S. Moon, X. Zhang
Argonne National Laboratory, USA

Abstract

A significant hurdle to the understanding of sprays is the link between nozzle geometry and the fluid distribution in the spray. X-ray radiography can help to clarify this link by providing quantitative measurements of the spray density in the near-nozzle region, including at the exit plane. The current work describes x-ray radiography measurements performed at Argonne National Laboratory under the “Spray A” conditions of the Engine Combustion Network. Four injector samples have been studied, and model-dependent reconstructions have been used to generate 3-D maps of the average fuel density as a function of time. These measurements reveal differences between the sprays from nominally identical injectors which can be interpreted in terms of geometric differences in the injector nozzles that have been measured previously.
