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# Qualitative Laser-Induced Incandescence Measurements of Particulate Emissions During Transient Operation of a TDI Diesel Engine

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## ABSTRACT

Laser-induced incandescence (LII) is a sensitive diagnostic technique capable of making exhaust particulate-matter measurements during transient operating conditions. This paper presents measurements of LII signals obtained from the exhaust gas of a 1.9-L TDI diesel engine. A scanning mobility particle sizer (SMPS) is used in fixed-size mode to obtain simultaneous number concentration measurements in real-time.

The transient studies presented include a cranking-start/idle/shutdown sequence, on/off cycling of EGR, and rapid load changes. The results show superior temporal response of LII compared to the SMPS. Additional advantages of LII are that exhaust dilution and cooling are not required, and that the signal amplitude is directly proportional to the carbon volume fraction and its temporal decay is related to the primary particle size.