

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

OH PLIF measurement in a spark ignition engine with a tumble flow¹ SIDDHARTHA KUMAR, TATSUYA MORONUKI, MASAYASU SHIMURA, YUKI MINAMOTO, Department of Mechanical Engineering, Tokyo Institute of Technology, Japan, TAKESHI YOKOMORI, Graduate School of Science and Technology, Keio University, Japan, MAMORU TANAHASHI, Department of Mechanical Engineering, Tokyo Institute of Technology, Japan, STRATEGIC INNOVATION PROGRAM (SIP) TEAM — Under lean conditions, high compression ratio and strong tumble flow; cycle-to-cycle variations of combustion in spark ignition (SI) engines is prominent, therefore, relation between flame propagation characteristics and increase of pressure needs to be clarified. The present study is aimed at exploring the spatial and temporal development of the flame kernel using OH planar laser-induced fluorescence (OH PLIF) in an optical SI engine. Equivalence ratio is changed at a fixed indicated mean effective pressure of 400 kPa. From the measurements taken at different crank angle degrees (CAD) after ignition, characteristics of flame behavior were investigated considering temporal evolution of in-cylinder pressure, and factors causing cycle-to-cycle variations are discussed. In addition, the effects of tumble flow intensity on flame propagation behavior were also investigated.

¹This work is supported by the Cross-ministerial Strategic Innovation Program (SIP), 'Innovative Combustion Technology'

Siddhartha Kumar
Tokyo Institute of Technology

Date submitted: 31 Jul 2017

Electronic form version 1.4