

Abstract Submitted  
for the DFD16 Meeting of  
The American Physical Society

**A high-order immersed boundary method for high-fidelity turbulent combustion simulations**<sup>1</sup> YUKI MINAMOTO, KOZO AOKI, KOSUKE OSAWA, Tokyo Institute of Technology, TUO SHI, The Hong Kong University of Science and Technology, ALEXANDRU PRODAN, Delft University of Technology, MAMORU TANAHASHI, Tokyo Institute of Technology — Direct numerical simulations (DNS) have played important roles in the research of turbulent combustion. With the recent advancement in high-performance computing, DNS of slightly complicated configurations such as V-, various jet and swirl flames have been performed, and such DNS will further our understanding on the physics of turbulent combustion. Since these configurations include walls that do not necessarily conform with the preferred mesh coordinates for combustion DNS, most of these simulations use presumed profiles for inflow/near-wall flows as boundary conditions. A high-order immersed boundary method suited for parallel computation is one way to improve these simulations. The present research implements such a boundary technique in a combustion DNS code, and simulations are performed to confirm its accuracy and performance.

<sup>1</sup>This work was partly supported by Council for Science, Technology and Innovation, Cross-ministerial Strategic Innovation Promotion Program (SIP), Innovative Combustion Technology (Funding agency: JST).

Yuki Minamoto  
Tokyo Institute of Technology

Date submitted: 30 Jul 2016

Electronic form version 1.4