Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Shock Wave Oscillation at Cylindrical Cavity on Wedge Surface in Mach-7 Hypersonic Flow.[1] YASUMASA WATANABE, The University of Tokyo, ALEKSANDAR JEMCOV, HIROTAKA SAKAUE, JOSEPH GONZALES, University of Notre Dame — This study explores the shock wave oscillation observed near a cylindrical cavity placed on the surface of a wedge model at a 30-degree angle in Mach-7 hypersonic flow. Since the behavior of such a shock wave is key to understanding the aerodynamic heating on space vehicles, a wind tunnel test was carried out to clarify this shock oscillation problem. Flow stagnation pressure and temperature were set to 950kPa and 500K respectively. A high-speed schlieren video showed that, with a 1-cm diameter cavity, the main oscillation frequency was around 5.4 kHz. Further measurements were done to quantify this phenomenon and these detailed results will be reported in a DFD 2020 presentation.

[1]This work is supported by Asia Research Collaboration Grant 373260-39121-10001 by Notre Dame International, University of Notre Dame. Experiments were performed by Y. Watanabe under support of JSPS Grant 20H02347.

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Date submitted: 03 Aug 2020 Electronic form version 1.4