Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Nozzle effects on global instabilities of supersonic jets[1] MICHAEL KARP, M. J. PHILIPP HACK, Center for Turbulence Research, Stanford University — We conduct global linear stability analyses of supersonic jets, with the aim of assessing the effect of the nozzle lip on the instability mechanism. The inclusion of the nozzle within the computational domain gives rise to absolute instability via a coupling between the downstream-traveling Kelvin-Helmholtz mode and the upstream-traveling acoustic wave in the vicinity of the nozzle lip. The features of the eigenmodes are discussed by applying the momentum potential theory of Doak (1989). The effect of varying the thickness of the nozzle is investigated and found to have a marginal influence on the instability mechanism. The sensitivity to the exit Mach number and the nozzle pressure ratio are explored.

[1]Air Force Office of Scientific Research grant 1194592- 1-TAAHO and Office of Naval Research grant N00014-17-1-2341

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Date submitted: 03 Aug 2020 Electronic form version 1.4