

# GALLERY OF FLUID MOTION (/)

*Presented by the APS Division of Fluid Dynamics*

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**75TH ANNUAL MEETING OF THE APS DIVISION OF FLUID DYNAMICS (NOVEMBER 20, 2022 — NOVEMBER 22, 2022)**

## V0026: Dynamic fully immersive virtual reality of supersonic flows



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In this video, we show high-fidelity numerical results of supersonic spatially-developing turbulent boundary layers (SDTBL) under strong concave and concave curvatures and Mach = 2.86. The selected numerical tool is Direct Numerical Simulation (DNS) with high spatial/temporal resolution. The prescribed concave geometry is based on the experimental study by Donovan et al. (*J. Fluid Mech.*, 259, 1-24, 1994). Turbulent inflow conditions are based on extracted data from a previous DNS over a flat plate (i.e., turbulence precursors). The comprehensive DNS information sheds important light on the transport phenomena inside turbulent boundary layers subject to strong deceleration or Adverse Pressure Gradient (APG) caused by concave walls as well as to strong

and hot walls). In this opportunity, the selected scientific visualization tool is Virtual Reality (VR) by extracting vortex core iso-surfaces via the Q-criterion to convert them to a file format readable by the HTC Vive VR toolkit. The reader is invited to visit our Virtual Wind Tunnel (VWT) under a fully immersive environment for further details.

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