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Effect of Pulsed Plasma Jets on Reflected Shock-Turbulent Boundary Layer Interaction[1] BENTON R. GREENE, NOEL T. CLEMENS, UT Austin Dept. of Aerospace Engineering and Engineering Mechanics, PATRICK MAGARI, DANIEL MICKA, Creare, Inc. — Shock-induced turbulent boundary layer separation can have many detrimental effects in supersonic inlets including flow instability, fatigue of structural panels, poor pressure recovery, and unstart. Pulsed plasma jets (or "spark jets"), zero net mass flow jets characterized by high bandwidth and the ability to direct momentum into the flow, are one promising method of reducing shock-induced separation and boundary layer distortion. The current study is focused on investigating the efficacy of pulsed plasma jets to reduce the boundary layer distortion induced by a reflected shock interaction in a Mach 3 flow. A 7° shock generator placed outside the tunnel ceiling boundary layer produces an incident shock on the floor of the tunnel of sufficient strength to induce separation. An array of pulsed plasma jets are placed approximately 2 boundary layer thicknesses upstream of the interaction and pulsed at between 1 kHz and 4 kHz. PIV is used to investigate the effect of the jets on the nature of the separation as well as the boundary layer distortion and pressure recovery downstream of the interaction.

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Benton R. Greene
UT Austin Dept. of Aerospace Engineering and Engineering Mechanics

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