Abstract Submitted
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Manipulation of separation by transverse blowing[1] LEON VAN DOMMELEN, HAN ZHAO, FAMU-FSU College of Engineering — Recent experiments have shown the potential to manipulate boundary-layer separation by means of transverse blowing using supersonic microjets. Such a mechanism is not explainable by means of a conventional boundary layer description; it requires the resolution of Görtler scale spanwise vorticity in a parabolized Navier-Stokes approach. It is shown that the Görtler mechanics of blowing with discrete jets is characterized by an viscous-inviscid interaction between opposing convection effects in the viscous flow near the wall and the immediately overlying irrotational flow that leads to two layers of counter-rotating vortices. Initially, the corresponding vortex motion is dominated by spanwise convection, but when the boundary layer thickens while approaching separation, nonlinear interactions between the vortices become possible to increase mixing. Effects of the mechanics of those vortices on the forming separation process will be discussed during the meeting. Since blowing can be much more reliable than suction under real-life conditions, the results can have significant potential practical application.

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