

Abstract Submitted  
for the DFD05 Meeting of  
The American Physical Society

**Interaction of a Free Turbulent Jet with a Synthetic Jet** DAVID TAMBURELLO, MICHAEL AMITAY, Rensselaer Polytechnic Institute — The mechanisms associated with active control of a turbulent radial free jet were investigated experimentally using PIV. The interaction of the main jet with a synthetic jet, driven at a frequency which corresponds to a main jet Strouhal number of 0.16, was explored and compared to the effects of a steady control jet at the same momentum coefficients. Unlike the steady control jet, which mainly vectors the main jet, thus affecting the mean and fluctuating velocity fields, the synthetic jet yields both vectoring of the main jet and its spreading in all directions. At low momentum coefficients, the main jet is slightly vectored away from the synthetic jet, where the additional energy to the coherent structures is the dominant mode of augmentation. At high momentum coefficients, the synthetic jet penetrates through the main jet flow, resulting in a significant modification of the flow field by vectoring the jet much farther than at lower momentum coefficients and enhancing spreading via high added energy to the main jet at selective modes.

Michael Amitay  
Rensselaer Polytechnic Institute

Date submitted: 10 Aug 2005

Electronic form version 1.4