

**ACOUSTICS2008/3491**  
**Correlations between the turbulent and the acoustic fields of a hot co-axial jet simulated by large-eddy simulation**

Christophe Bogey and Francois Coiffet  
Ecole Centrale de Lyon, 36, avenue Guy de Collongue, LMFA, 69134 Ecully, France

Correlations between the turbulent and the acoustic fields of a high-speed hot co-axial jet are calculated, in order to study noise generation mechanisms by a causality method. The jet flow was computed by a large-eddy simulation using specific aeroacoustic schemes. The simulation also provided directly the near-pressure field, which was then extrapolated in the far field by solving the linear acoustic equations. The causality method is applied using flow quantities such as the velocity components, density, and temperature in the jet and the far field pressure, in the temporal as well as in the spectral domains. To exhibit and characterize the regions of noise generation, we are focusing on the correlation peaks, and in particular their location and corresponding frequencies. Moreover, there is an attempt to link the noise generation with the jet turbulence properties including intermittency and convection velocity. For instance, the turbulence at the end of the primary potential core was found to show high correlations with the far field pressure and significant intermittency, in a similar way as in single-stream jets.