Abstract Submitted
for the 4CF15 Meeting of
The American Physical Society

Quantitative nonlinearity in subsonic and supersonic model-scale jet noise.[1] KYLE MILLER, Brigham Young Univ - Provo — Understanding the impact of jet noise, including annoyance due to crackle, can be improved by quantifying the nonlinearity in a signal with a single-microphone measurement. An ensemble-averaged, frequency-domain version of the generalized Burgers equation has been used to find a quantitative expression for the change in sound pressure level spectrum, L_p, with distance, r, due to the separate effects of geometric spreading, absorption, and nonlinearity. The nonlinear term, based on the dimensionless nonlinearity indicator known as "Q/S," has been used to characterize the frequency-dependent nonlinearity as a function of angle and distance in subsonic (Mach-0.85), overexpanded (Mach-1.8), and ideally expanded (Mach-2.0) model-scale jet data. Analyses show that nonlinear effects in the Mach-2.0 data are about twice as strong as those in the Mach-1.8 data, but such effects are completely absent in the Mach-0.85 data.

[1]Work supported by the AFRL SBIR program.

Kyle Miller
Brigham Young Univ - Provo

Date submitted: 03 Sep 2015 Electronic form version 1.4