Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

**Large eddy simulations of turbulent coaxial jet flows with pulsation** SEONG JAE JANG, HYUNG JIN SUNG, KAIST — Large eddy simulations of turbulent confined coaxial jet flows were performed at Re=9,000 based on the bulk velocity and outer radius of annular jet. Pulsations were superimposed on the inflow jets. The mean velocity ratio of annular jet to central jet is 1.667. The pulsation amplitudes of annular and central jets are 5% and 20%, respectively. Main control parameters were the pulsation frequency and the phase difference between annular and central jets. Effects of inflow pulsation on flow dynamics and mixing were investigated. We found that there exist two optimal pulsation frequencies: one is observed at St=0.327 for the minimum reattachment length on the chamber wall and the other is at St=0.180 for the maximum mixing in the shear layer. At the optimal pulsation frequency with the minimum reattachment length, effects of the phase difference between annular and central jets were scrutinized by examining the phase- or time-averaged turbulent statistics. The most effective phase difference for the reduction of reattachment length is obtained at 30°, and for the maximum mixing enhancement is obtained at 270°. For the phase difference 210°, the reattachment length and mixing efficiency are almost the same as those of no-pulsation. Dynamics and interactions of vortical structures in the shear layers developed between two jet flows and between annular jet and chamber flow were studied. The mechanism of mixing enhancement was also discussed.

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Date submitted: 06 Aug 2008 Electronic form version 1.4