ACOUSTICS2008/2842
Flow field and acoustic characteristics of an acoustically forced burner impinging jet

Yang Zhang, Saad Hajim, Jason Bassi and S Farhat
The University of Manchester, School of Mechanical, Aerospace and Civil Engineering, George Begg Building, M60 1QD Manchester, UK

The flow field and acoustic characteristics of a turbulent impinging jet from an impinging burner have been investigated experimentally. The effect of acoustically excited upstream flow with a range of driving frequencies from 0 to 3000Hz and use of perforated plate near the nozzle have been studied to achieve modifications to the near-field and far-field of the jet. The acoustic response of the burner to upstream acoustically excited flow under different geometry configurations was investigated in detail. The burner components were found to have a significant effect on the burner acoustic response, with overall damping and enhancement achieved over the full driving frequency range. The velocity flow field of the impinging jet, including spectra and rms data, were mapped from the burner nozzle to the plate with CTA measurements with three acoustic excitation frequencies and no excitation; 0Hz, 52.5Hz, 75Hz and 530Hz (within acoustic mode bands of burner).The results show that excitation frequencies of 52.5Hz and 75Hz were found to propagate all the way to the plate, whilst 530Hz dissipates near the nozzle exit. (Re = 16,200 , H/D = 3, nozzle velocity profile).