Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Plume Chamber studies to characterize Turbulent Buoyant Plumes using multiple sensors. DANIEL BRUN, SUDHEER REDDY BHIMIREDDY, KIRAN BHAGANAGAR, University of Texas at San Antonio — Turbulent axisymmetric buoyant plumes released into calm air are studied experimentally using multiple sensing techniques by a hot-wire anemometer, Schlieren imaging and a FLIR VUE pro thermal camera. Heated Carbon Dioxide is released into a plume chamber under controlled conditions at a nozzle exit Reynolds number ranging from 1300 to 2000. The buoyancy flux and momentum flux at the nozzle exit are varied to study the flow behavior as a function of initial conditions. Time-averaged statistics such as centerline velocity, temperature and plume half-width are calculated using hot-wire readings and image-processing of thermal camera and Schlieren recordings. To better understand the effect of buoyancy on turbulence and mean velocity, a reference case with no buoyancy flux at nozzle exit is studied.

Sudheer Reddy Bhimireddy
University of Texas at San Antonio

Date submitted: 31 Jul 2019 Electronic form version 1.4