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Multiwindow PIV measurements around a breathing manikin

DAVID MARR, RITESH SHETH, MARK GLAUSER, HIROSHI HIGUCHI, Syracuse University — The presented work includes multiscale measurements via a stereo article Image Velocimetry (PIV) system to view a pair of twocomponent windows of dissimilar scale using a varied focal length. These measurements are taken in the breathing zone of an isothermal breathing manikin (from mouth) in an environmental chamber of average office cubicle dimensions without ventilation and are analogous to an oscillatory jet. From these phaseaveraged measurements, we can extract information concerning length scales, turbulence quantities and low dimensional information in order to both determine correlation between data at different length scales as well as continuing research in exposure assessment for the indoor environment. In this talk we will present these turbulence quantities and interpret their influence on the breathing zone. While the largest scale is that of the room itself, we find that the relevant spatial scales associated with the breathing zone are much lower in magnitude. In future experiments, we will expand the multi window PIV technique to include PIV window configured to obtain scales of order the cubicle simultaneously with those of the breathing zone. This will aid in our understanding of the combined impact of these multiple scales on occupant exposure in the indoor environment.

Mark Glauser
Syracuse University

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