

Simulation based modeling of human-induced contaminant transports in indoor environment

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ABSTRACT

Both indoor air quality (IAQ) and thermal comfort are fundamental to the well-being of human occupants in indoor environments. To solve IAQ problems and to control contaminant dispersion, it is useful to predict the airflow patterns and contaminant dispersion due to short-term transient events, such as human and door motion. This talk will focus on the recent development of an immersed boundary method for simulating fluid, thermo-and particle (or contaminant) dynamics within enclosed spaces under influences of human motion and other dynamic effects. The approach combines a large-eddy simulation technique with the immersed boundary method for simulating complicated motion events. The human object is rendered as a level set in the computational domain, and realistic human walking motion is implemented using a human kinematics model. A system-level modeling on contaminant transports in generic indoor environments will be discussed in the meeting.