Abstract Submitted for the DFD07 Meeting of The American Physical Society

Three-dimensional temperature reconstruction of steady and unsteady buoyant plume by background schlieren technique combined with computed tomography. NOBUYUKI FUJISAWA, GEN SATO, Niigata University — The three-dimensional temperature fields of steady and unsteady buoyant plume issuing into a stagnant surroundings of water are measured by background schlieren technique combined with computed tomography. The measurement system consists of three CCD cameras, inline illuminations system and some optics, which allow three observations of refractive index field of the buoyant plume. The threedimensional reconstruction technique is applied to the refractive index fields using multiplicative algebraic reconstruction technique for computed tomography. After the confirmation of the reconstruction accuracy with the thermocouple measurement, the experimental technique is applied to the three-dimensional temperature measurement of unsteady buoyant plume. The result reproduces well the unsteady three-dimensional behavior of the plume.

> Nobuyuki Fujisawa Niigata University

Date submitted: 30 Jul 2007

Electronic form version 1.4