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X-ray densitometry based void fraction flow field measurements of cavitating flow in the wake of a circular cylinder TIEZHI SUN, Harbin Institute of Technology, HARISH GANESH, STEVEN CECCIO, University of Michigan — At sufficiently low cavitation number, the wake vortices behind bluff objects will cavitate. The presence of developed cavitation can alter the underlying vortical flow. In this study, cavitation dynamics in the wake of a circular cylinder is examined in order to determine the relationship between the void fraction in the cavity wake and the resulting modification to the flow compared to the non-cavitating flow. Cavitation in the wake of a cylinder is investigated using high-speed video cameras and cinematographic X-ray densitometry. Using synchronized top and side views from high-speed video cameras, the morphology and extent of the cavities forming on the wake of the circular cylinder is studied for a range of cavitation numbers, at a Reynolds number of 1×10^{-5} , which lies at the transition region between sub-critical to critical regime of wake transitions. The time resolved and mean X-ray densitometry based void fraction of the spanwise and plan view averaged flow field will be related to the vortex dynamics in an attempt to understand the role of vapor production in the observed dynamics.

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