Abstract Submitted
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High-speed imaging of submerged jet: visualization analysis using proper orthogonality decomposition.[1] YINGZHENG LIU, CHUANGXIN HE, Shanghai Jiao Tong University — In the present study, the submerged jet at low Reynolds numbers was visualized using laser induced fluoresce and high-speed imaging in a water tank. Well-controlled calibration was made to determine linear dependency region of the fluoresce intensity on its concentration. Subsequently, the jet fluid issuing from a circular pipe was visualized using a high-speed camera. The animation sequence of the visualized jet flow field was supplied for the snapshot proper orthogonality decomposition (POD) analysis. Spatio-temporally varying structures superimposed in the unsteady fluid flow were identified, e.g., the axisymmetric mode and the helical mode, which were reflected from the dominant POD modes. The coefficients of the POD modes give strong indication of temporal and spectral features of the corresponding unsteady events. The reconstruction using the time-mean visualization and the selected POD modes was conducted to reveal the convective motion of the buried vortical structures.

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