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Visualization of Pulsating Low-Speed Flows from a Basic Annular Jet[1] A. SANTIAGO PADRON, University of Minnesota, JOHN BAKER, University of Alabama — Results of a study involving pulsating low-speed free jets issuing from an annular orifice into a quiescent medium are discussed. Transient flow behavior associated with pulsating jets is known to affect entrainment, mixing, and spread rate characteristics. Also, annular jet flows often provide a better description of the flow associated with nozzles used in engineering applications. However, the flow phenomena related to pulsating annular jets is still not fully understood. In this study, flow in the initial region of a pulsating low-speed annular water jet issuing into a quiescent water reservoir was visualized by means of a dye. The blocking ratio was fixed at 0.7. The Reynolds number was varied from 59 to 155 and the Strouhal number from 0.133 to 1.90. For the experimental conditions considered, two different flow regimes were observed. At high pulse frequencies, the flow field resembled that of the steady annular jet. As the frequency decreased, the flow transitions into a structure composed of a train of toroidal vortices, i.e. vortex rings. The frequency at which transition occurred was proportional to the Reynolds number.

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