

Abstract Submitted
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Time-Resolved 3-component velocity measurements of an array of heated jets¹ JACK STEPAN², BARTON SMITH³, Utah State University — Time-Resolved Stereo Particle Image Velocimetry measurements of an array of round, heated jets are presented. A total of 37 jets are generated from a single plenum. The parameter space measured consists of a single Reynolds number (600) and a range of Archimedes numbers, which is a measure of the effects of buoyancy compared to inertia. The PIV cameras look down on the exit plane and measure in a plane normal to the jet exits. The cross-stream extent of the measurement domain contains seven of the jets at the jet exit. Measurements are made at the exit as well as at several downstream locations. With no heating, the flow at the exit of the jets is nearly uniform, and the flow is periodic. However, under even small amounts of heating, convection effects in the plenum lead to three-dimensional motions at the exit. The interaction between the jets is greatly enhanced by heating, and temporal periodicity appears to develop. Any spatial periodicity is destroyed. The distance downstream of the merge points of the jets moves upstream significantly under heating.

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