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Flow field characteristics of impinging sweeping jets: TR-PIV measurement. XIN WEN, DI PENG, YINGZHENG LIU, Shanghai Jiao Tong University, HUI TANG, The Hong Kong Polytechnic University — Influence of Reynolds number of sweeping jets on its impinging flow fields was extensively investigated in a water tank. Toward this end, a fluidic oscillator was specially designed to produce spatially sweeping jets which imping on a flat plate. Six Reynolds numbers were tested by controlling the supply flow rate of the fluidic oscillator. Impinging flow fields were captured by time-resolved Particle Image Velocimetry (TR-PIV) measurement. Reference signals were extracted from the flow fields for phase reconstruction. The oscillating flow fields with super-harmonic frequency at different regions were discussed in term of the phase-averaged velocity, vorticity and turbulent velocity. Dynamic mode decomposition (DMD) was used to capture the most-energetic flow patterns with distinct frequencies. By projecting the phase-averaged flow fields onto a reduced basis of DMD modes, the phase correlation between the distinct flow patterns were analyzed under different Reynolds numbers.

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