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Experimental investigation of turbulent wall jet MATTHIEU A. ANDRE, PHILIPPE M. BARDET — Water jet flowing on a flat plate surrounded by quiescent air constitutes a standard case for the study of the interaction between turbulence and the liquid-air interface. This is of particular interest in the understanding of heat and mass transfers across interfaces. The structure of the surface has a great influence on the rate of the transfers which is critical for chemical processes like separation or absorption; pool-type nuclear reactor; climate modeling etc. This study focuses on high Froude (8 to 12) and Weber (3300 to 7400) numbers at which the surface exhibits small wavelength and large amplitude deformations, such as ligaments, surface break up with air entrainment and droplets projection. The experiment features a high velocity (up to 7.5 m/s) water wall jet (19.05mm thick at the nozzle exit) flowing on a flat plate ($Re = 10^5$ to $1.5 \cdot 10^5$). High speed movies and PLIF visualization show the evolution of the surface from smooth to 2D structures, then 3D disturbances as the turbulence arising from the wall interacts with the surface.

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