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Experimental studies on circular and AR4 elliptic vortex-ring impingement upon inclined surfaces SHENGXIAN SHI, Shanghai Jiao Tong Univ, TZE HOW NEW, Nanyang Technological University, JIAN CHEN, Shanghai Jiao Tong Univ — PLIF flow visualisation and TR-PIV measurements were performed on the impingement of circular and AR4 elliptic vortex-rings upon flat surface with different inclination angles at $Re=4000$. This is aimed to investigate the effects of nozzle geometry, surface inclination angle and exit-surface separation distance on the vortex-ring impingement behaviour. Separation distance between nozzle exit and flat surface were adjusted for the elliptic vortex-ring so as to examine the flow structures for impingement prior, at and posterior the axis-switching point. Current results on circular vortex-ring show that at low inclination angle, vortex-ring underwent severe stretching during the impingement and vortex-ring core closer to the flat surface was observed to induce secondary vortex-ring and pair with it before its pinch-off. Meanwhile, vortex-ring core further away from the flat surface produced secondary and tertiary vortex-rings before transit into turbulence. At high inclination angles, vortex-ring core closer to the flat surface was quickly entrained by the primary vortex-ring after the impingement. Experiments on elliptic vortex-ring are undergoing at the moment, more findings will be presented in the conference.

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