

## Reynolds number effect on the wake of elliptical cylinder

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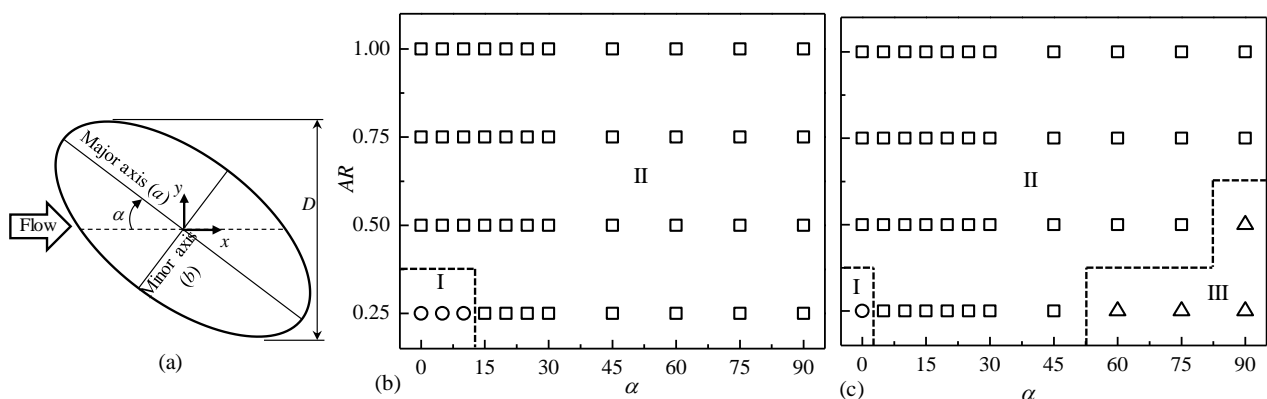
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### ABSTRACT

The effects of Reynolds number  $Re_D$  ( $= 100-150$ ), cross-sectional aspect ratio  $AR$  ( $= 0.25$  to  $1.0$ ), and attack angle of  $\alpha$  ( $= 0^\circ - 90^\circ$ ) on the wake of elliptical cylinder are numerically investigated, where  $Re_D$  is based on the freestream velocity and the cylinder cross-section height normal to the freestream flow,  $AR$  is the ratio of the minor axis to the major axis, and  $\alpha$  is the angle between the major axis and the incoming flow. At  $Re_D = 100$ , two distinct wake structures are identified, namely 'Steady wake' (pattern I) and 'Karman wake followed by steady wake (pattern II)' when  $AR$  and  $\alpha$  are varied in the ranges specified (Fig. 1). When  $Re_D$  is increased to 150, an additional wake pattern, 'Karman wake followed by secondary wake (pattern III)' materializes. Pattern I is characterised by two steady bubbles forming behind the cylinder. Pattern II features Karman vortex street immediately behind the cylinder, with the Karman street transmuting to two steady shear layers downstream. In Pattern III, the Karman street forming behind the cylinder is modified to a secondary vortex street.



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