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Nuances between flags fluttering in horizontal and vertical flows EMMANUEL VIROT, PASCAL HEMON, XAVIER AMANDOLESE, LadHyX, Ecole Polytechnique — When placed in a constant-velocity flow, a flag starts suddenly to flutter above a critical flow velocity. It appears that the same flag hanged horizontally or vertically exhibits different behaviors. The critical velocity is higher in the vertical case, suggesting an important role of gravity. To investigate the influence of length, width and thickness of paper flags, we perform experiments in both horizontal and vertical wind tunnels. The involvement of elasticity, fluid friction-induced tension or gravity-induced tension on the flag flutter will be discussed. The flag can be also a mean to harvest the wind kinetic energy: in a preliminary approach, we measure and discuss periodic forces that a horizontal flapping flag produces on his shaft.

Emmanuel Virot LadHyX, Ecole Polytechnique

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