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On the spanwise variation of vortex shedding in the wake of slender cones CHETAN JAGADEESH, MICHAEL GASTER, Queen Mary, University of London — The present work aims to study the spanwise variation of vortex shedding in the wake of slender cones at low Reynolds numbers. The occurrence of modulated velocity fluctuations is associated with cellular vortex shedding, with the discontinuities responsible for these modulations occurring at discrete locations along the span. Hot-wire data showed that the increase in amount of taper resulted in the increase in the number of vortex shedding cells in the wake, with the velocity fluctuations being modulated at all locations along the span of highly tapered cones. Comparing flow visualization images, hot-wire signals and corresponding streamwise velocity contours, one can confirm that the activity seen in the junction of parallel and tilted vortex lines is indeed the discontinuity and the discontinuity appears to move along the span of the cone in time. The tilting of vortices is periodic and continues along the span of the cone as time progresses and is surmised that as the vortex lines reach a certain large angle the process gets disrupted, resulting in the so-called discontinuity. This process then occurs at the next spanwise location, until it reaches a local diameter where the Reynolds number is too low for periodic vortex shedding. Thus the movement of the discontinuity in the wake of the highly tapered cone could lead to a scenario where the so-called cells could be considered to be non-stationary, or in other words moving.

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