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Amplification of Vorticity Near the Stagnation Point of Landing Gear Wheels GRAHAM FELTHAM, ALIS EKMEKCI, University of Toronto — In this experimental investigation, a stream of steady weak vorticity impinging near the stagnation point of a landing gear wheel is shown to grow and amplify into large-scale vortices that coherently shed from the point of generation. To produce the upstream vorticity, a platinum wire of 100 micron diameter, similar to that used in hydrogen bubble visualization technique, is placed upstream of the wheel model. Experiments are conducted in a recirculating water channel. The wheel diameter is D = 152 mm. The Reynolds number based on the wire diameter is 21 and based on the wheel diameter is 32,500. Qualitative understanding of the vorticity amplification and eventual vortex shedding near the stagnation region of the wheel is achieved by employing the hydrogen bubble visualization technique while quantitative insight is collected using Particle Image Velocimetry (PIV). The size and frequency of the shed vortices are found to depend on the wheel geometry as well as the magnitude and impingement point of the inbound vorticity.

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