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The formation process of leading and secondary vortices DIEGO FRANCESCANGELI, KAREN MULLENERS, EPFL — Vortex formation is a limiting process. When a plate is accelerated from rest or fluid is impulsively ejected from a piston-cylinder apparatus, a primary or leading vortex grows in size and strength up to a limit when it pinches-off. Beyond this point, secondary vortices akin to a Kelvin-Helmholtz instability are generated. These secondary vortices are similar to each other but smaller in size and lower in strength than the leading vortex. The motivation to understanding the difference between the leading and secondary vortices, leads us to study the formation process of vortices around a moving rectangular plate in a quiescent fluid. Eulerian and Lagrangian methods are used to track vortices and determine their circulation, vorticity distribution, and size from experimental velocity field data. The experimental data is further compared with different theoretical vortex models to elucidate the differences between the formation process of the leading and the secondary vortices.

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