Spatial stability and the onset of absolute instability of Batchelor vortex for high swirl numbers[1] LUIS PARRAS, RAMON FERNANDEZ-FERIA, University of Malaga (Spain) — Batchelor's vortex has been commonly used in the past as a model for aircraft trailing vortices. Using a temporal stability analysis, Fabre and Jacquin [*J. Fluid Mech.* **500,** 239 (2004)] have recently found new viscous unstable modes for the high swirl numbers of interest in actual large-aircraft vortices. We look here for these unstable viscous modes occurring at large swirl numbers ($q > 1.5$), and large Reynolds numbers ($Re > 10^3$), using a spatial stability analysis, thus characterizing the frequencies at which these modes become convectively unstable for different values of q, of Re, and for different intensities of the uniform axial flow. We consider both jet-like and wake-like Bartchelor's vortices, and are able to reach values of Re as high as 10^8. We also characterize the onset of absolute instability of these unstable viscous modes for large q.

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