Effect of curvature modulation on Gortler vortices in boundary layers[1] HUI XU, Department of Aeronautics, Imperial College London, PHILIP HALL, Department of Mathematics, Imperial College London, SPENCER SHERWIN, Department of Aeronautics, Imperial College London — The stability of a high-Reynolds-number flow over a curved surface with varying curvature is studied. The investigation is concentrated on spanwise-periodic vortices of wavelength comparable with the boundary layer thickness. Motivated by the amendment of Rayleigh's criterion (Hall,2013), the effect of wavy-wall modulation on Gortler vortices is addressed. Both linear and nonlinear investigations are performed to understand the destabilization and stabilization mechanisms of the vortices. Furthermore, due to the wavy-wall curvature modulation, the growth or decay rate of the vortices is discussed. Finally, a control strategy of the vortices is proposed based on distributing the curvature.

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