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Receptivity of Görtler Flow LARS-UVE SCHRADER, LUCA BRANDT, DAN HENNINGSON, KTH Mechanics, Stockholm, Sweden, TAMER ZAKI, Imperial College London, UK — The flow over a concave surface, e.g. the lower side of a turbine blade, is subject to centrifugal forces which may destabilize the boundary layer. The instabilities appear as streamwise aligned counter-rotating vortices and may be steady or traveling, depending on the perturbation source. We consider the boundary layer on a concave wall with constant radius of curvature and expose the flow to two different disturbance sources: streamwise-localized, spanwise-sinusoidal roughness elements and free-stream vortical disturbances modeled by continuous-spectrum modes for the Blasius inflow. Results from numerical simulations using the Spectral Element Method (SEM) will be shown. The SEM provides spectral accuracy while allowing for geometries beyond the scope of global spectral methods based on Fourier modes. Owing to the non-parallel nature of the Görtler vortices, three-dimensional simulations are in particular appropriate to characterize the receptivity of the Görtler boundary layer.

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