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Heat transfer enhancement by primary and secondary Gortler instabilities LADAN MOMAYEZ[1], Ministry of Science, Research, Technology of Iran & Laboratoire de Thermocinétique, CNRS-UMR 6607, Université de Nantes, France, PASCAL DUPONT, HASSAN PEERHOSSAINI, Laboratoire de Thermocinétique, CNRS-UMR 6607, Ecole Polytechnique de l'Université de Nantes, BP 50609, F-44306, Nantes, France — Heat transfer along a concave surface is more efficient than on the classical flat plate since the boundary layer is subjected to different instability mechanisms: the centrifugal instability, referred to as the primary Gortler instability, which generates steady longitudinal vortices; and the shear instability, called the secondary Gortler instability, which causes unsteadiness and transition to turbulence. The systematic measurement of wall heat transfer and mean and turbulent velocities for different upstream perturbation conditions allowed the relative influence of each instability on the heat transfer. It is shown that low amplitude and large wavelength perturbations excite the primary instability, where as strong perturbation amplitudes and small wavelengths preferentially cause the secondary instability.

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