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Analysis of the transition between Kelvin's equilibria using proper orthogonal decomposition MIRA KIM, Concordia University, HAMID AIT ABDERRAHMANE, Khalifa University, HOI DICK NG, GEORGIOS VATISTAS, Concordia University — The stirring flow driven by a rotating disk of a shallow water layer confined in a cylindrical bucket is revisited. The formation of a system of two and three satellite vortices, nested within slightly elliptical and triangular paraboloid free surface, orbiting around the center of the disk, is observed. At critical disk speeds transitions between these two systems of satellite vortices occur. These transitions were imaged and the velocity fields at the free surface of the shallow water were obtained via particle image velocimetry (PIV) measurement. The nucleation or the inhalation of the satellite vortex during the two transitions is discussed in relation with the eigenmodes of the vortex-patterns.

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