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Unusual Result of Non-Linear Wave Interaction VALENTINA SHEVTSOVA, DENIS MELNIKOV, University of Brussels, ALEX NEPOMNYASHCHY, Israel Institute of Technology, Haifa, ESA TOPICAL TEAM — Combination of different types of convective instabilities has been often observed in liquid layers and thin films. In large systems with cylindrical symmetry the investigation of the thermocapillary flows usually revealed the appearance of hydrothermal waves, either standing or travelling azimuthally. However, the increase of the liquid bridge aspect ratio (cylinder length) may cause the development of some unexpected flow patterns. The time-dependent thermocapillary convection has been studied numerically in a liquid bridge with aspect ratio *height/radius =1.8* and Prandtl number *Pr=14*. The animation of 3D numerical results shows that slightly above the threshold of instability a new scenario is realized instead an azimuthally travelling wave. At the mid-height of the liquid bridge, spots of the temperature disturbances travel counter-clockwise during about 2/3 of an oscillation period, and then they change the direction of motion. A detailed non-linear analysis has shown that this phenomenon is caused by the presence of an additional almost stationary (slowly varying in time) 3D structure. The superposition of both structures creates an illusion that the azimuthal direction of the disturbance propagation changes its sign during a certain part of the period.

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