3D-Temperature-Visualization-Method

for Convection-Experiments in the Laboratory

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During the last years, the possibilities to image the Temperaturefield in Laboratory experiments have greatly improved by using Thermochromic Liquid-Crystals (TLC). Those TLCs have the property to reflect the light of a certain wavelength at a certain temperature via Bragg diffraction. Using different kind of TLCs and illuminating them with a constant wavelength (using a lasersheet), it is now possible to observe different isotherms on a 2D-image within an accuracy of 0.1%. As the obtained images depend on the chosen position for the lasersheet, this method is sufficient for axissymmetrical problems (single-plume experiments) but becomes more difficult to handle for a Rayleigh-Bénard-setup. To get a better understanding of how the spatial pattern evoloves through time, we therefore developped a 3D-Visualization-Method: by scanning rapidly the tank, we can reconstruct a 3D-image of the brightest isotherm.