

## Experimental Detection of the New Phenomenon of Turbulent Thermal Diffusion

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A new phenomenon of turbulent thermal diffusion, which was predicted theoretically by Elperin et al. (1996), has been detected experimentally in oscillating grids turbulence with an imposed mean temperature gradient in air flow. This effect implies an additional mean flux of particles in the direction opposite to the mean temperature gradient and results in formation of large-scale inhomogeneities in the spatial distribution of particles. We used Particle Image Velocimetry to determine the turbulent velocity field and an Image Processing Technique to determine the spatial distribution of particles. Analysis of the intensity of laser light Mie scattering by particles showed that they are accumulated in the vicinity of the mean fluid temperature minimum due to turbulent thermal diffusion. In a flow with unstable stratification (heated bottom and cooled top walls of the chamber) the turbulent thermal diffusion coefficient was larger than that for a flow with a stable stratification.

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