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Brandenburg University of Technology Cottbus - Senftenberg

Offer of Master Project

DEPIK – TEHD: Experimental analysis of the convective flow induced in a tilted rectangular cavity by the Earth's gravity and an electric gravity.

Project description:

A fluid confined between two parallel plates maintained at different temperatures exhibits natural convective flows when the Earth's gravity and a fluid's density gradient are not parallel. The angle between the rectangular cavity formed by the two plates and the vertical direction has a direct impact on the fluid velocity and on the global flow structure. An alternating electric flied can be applied between the two plates so an effective electric gravity combines with the Earth's gravity (see Figure 1).

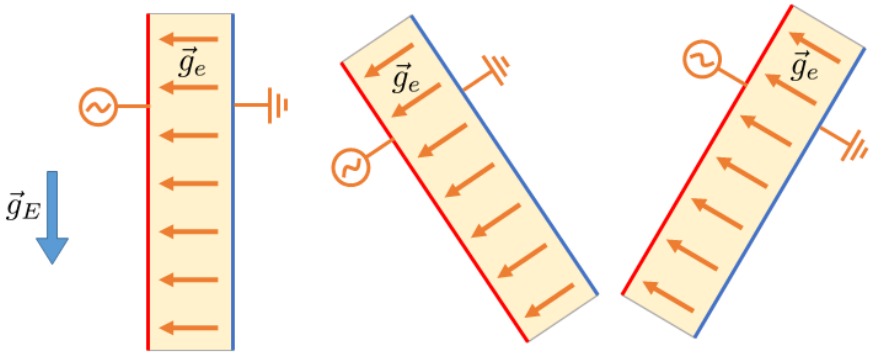

Figure 1: Schematic representation of 3 rectangular cavity with different tilting angles. The total gravity $\vec{G} = \vec{g}_E + \vec{g}_e$ and the corresponding natural convective flow depend on that angle.

The total gravity resulting from the sum of the Earth's gravity and that of the electric gravity changes depending on the strength of the electric field and on the tilting angle of the rectangular cavity.

The objective of the present project is to characterize experimentally the flow of natural convection for different angles and to highlight the roll that the artificial electric gravity could play on the flow. For that purpose, Particle Image Velocimetry will be used.

We are looking for a physics or engineering student to perform laboratory experiments and data analysis. The candidate will need to familiarize with the scientific research process by studying the bibliography, experimenting, post-treating images and data, analysing and discussing their findings.

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