

Laboratory experiments on fluid convections in a rotating plane cell and a rotating spherical shell with radial gravity

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Thermal convections in rotating spherical shell attract much attention from viewpoint of the relation to flows in the Sun and giant planets etc, and theoretical and numerical studies have been intensively carried out, so far. However, laboratory experiment was missing because of the difficulty to produce radial gravity force in laboratory, except for a spacelab experiment carried out in the space shuttle *Challenger* [1]. In our laboratory experiment, we overcome the difficulty due to utilizing electrohydrodynamic convection in a liquid crystal. The radial force of gravity is modelled by imposing an electric field across the shell, in which liquid crystal is encapsulated. The rotating was applied up to the condition with Rossby number less than unity. It was observed that the characteristics of convection was affected by the applied rotation in the plane cell. The experiment with the geometry of spherical cell will be also presented in the conference.

[1] J. Toomre, J. E. Hart and G. A. Glatzmaier, "The Internal Solar Angular velocity", Chapter 5, pp. 27-44, Springer, 1987.