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**Convection in rotating flows with simultaneous imposition of radial and vertical temperature gradients** AYAN KUMAR BANERJEE, AMITABH BHATTACHARYA, SRIDHAR BALASUBRAMANIAN, Indian Inst of Tech-Bombay — Laboratory experiments, with a rotating cylindrical annulus and thermal gradient in both radial and vertical directions (so that radial temperature difference decreases with the elevation), were conducted to study the convection dynamics and heat transport. Temperature data captured using thermocouples, combined with ANSYS Fluent simulation hinted at the co-existence of thermal plume and baroclinicity (inclined isotherms). Presence of columnar plume structure parallel to the rotation axis was found, which had a phase velocity and aided in vertical heat transport. Nusselt number (Nu) plotted as a function of Taylor number (Ta) showed the effect of rotation on heat transport in such systems, where the interplay of plumes and baroclinic waves control the scalar transport. Laser based PIV imaging at a single vertical plane also showed evidence of such flow structures.

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