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A New Theory For Convection In Rapidly Rotating Spherical Systems

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Thermal convection in rapidly rotating, self-gravitating Boussinesq fluid spherical systems is a classical problem and has important applications for many geophysical and astrophysical problems. The convection problem is characterized by the three physical parameters, the Rayleigh number R, the Prandtl number Pr and the Ekman number E. This paper reports a new convection theory in rapidly rotating spherical systems valid for a small E and all values of Pr. The new theory units the two previously disjointed subjects in rotating fluids: inertial waves and thermal convection. Both linear and nonlinear properties of the problem will be discussed.

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