

Effects of the inhomogeneous thermal state at CMB on a dynamo process in the outer core

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We investigate possible effects of a thermally inhomogeneous core-mantle boundary(CMB) on an MHD dynamo model. Since the outer core fluid moves much faster than the solid mantle, the temperature at CMB can be regarded as almost homogeneous. Therefore, we consider the inhomogeneity in heat flux as the boundary conditions in the model. Two cases are considered; the heat flux is homogeneous, or it is inhomogeneous as represented by $C_{\text{lateral}}Y(l=2, m=2C)$. In the inhomogeneous case, the energy of velocity and magnetic fields is much larger than that in the homogeneous case. It was found that the critical Rayleigh number tends to be smaller in the inhomogeneous case. Thus, CMB has a considerable influence on a dynamo process in the outer core.