

# HELICITY OF MAGNETOSTROPHIC WAVES AND SCALING FOR A KINEMATIC DYNAMO

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**Abstract.** The role of magnetostrophic waves in the problem of kinematic  $\alpha^2$ -dynamo was considered under assumption that the waves can be generated in the equatorial plane of the liquid core far from its boundaries and tangent cylinder.

**Keywords:** magnetostrophic waves, Earth's liquid core,  $\alpha^2$ -dynamo.

## References

- Reshetnyak M.Yu. and Sokolov D.D. Geomagnetic field intensity and helicity suppression in geodynamo, *Izv. Phys. Solid Earth*, 2003, no. 9, pp. 82-86.
- Fishman V.M. MAC waves localization by nonuniform rotation, *Geomagnetism and Aeronomy*, 1990, vol. 30, pp. 837-839.
- Shalimov S.L. On the minimal instability time of hydromagnetic flows in the Earth's, *Izv. Phys. Solid Earth*, 2013, vol. 49, no. 5, pp. 743-745.
- Shalimov S.L. On role of magnetostrophic wave in geodynamo *Izv. Phys. Solid Earth*, 2017, no. 3, pp. 488-491.
- Anufriev A. An alpha-effect on the core-mantle boundary, *Geophys. Astrophys. Fluid. Dyn.*, 1991, vol. 57, pp. 135-143.
- Davidson P.A. *Turbulence; an introduction for scientists and engineers*. 2004, Oxford Univ. Press.
- Davidson P.A. *Turbulence in Rotating, Stratified and Electrically Conducting Fluids*. Cambridge Univ. Press, 2013.
- Gissinger C., Ji H., and Goodman J. Instabilities in magnetized spherical Couette flow, *Phys. Rev. E.*, 2011, vol. 84, 026308-1-10.
- Kuang W. and Bloxham J. An Earth-like numerical dynamo model, *Nature*, 1997, vol. 389, pp. 371-374.
- Moffatt H.K. *Magnetic field generation in electrically conducting fluids*. Cambridge University Press, 1978.
- Moffatt H.K. Magnetostrophic turbulence and the geodynamo, *Proc. IUTAM symposium on computational physics and new perspectives in turbulence*, ed. Y. Kaneda, Springer, 2008, pp. 339-346.
- Parker E. N. Hydromagnetic dynamo models, *Astrophys. J.*, 1955, vol. 122, pp. 293-314.
- Roberts P. and Glatzmaier G. Geodynamo: theory and simulations, *Rev. Mod. Phys.*, 2000, vol. 72, no. 4, pp. 1081-1125.
- Shimizu H. and Loper D.E. Small-scale helicity and  $\alpha$ -effect in the Earth's core, *Phys. Earth Planet. Inter.*, 2000, vol. 121, pp. 139-155.
- Yadav R.K. and Gastine T., Christensen U.R. Scaling laws in spherical shell dynamos with free-slip boundaries, *Icarus*, 2013, vol. 225, pp. 184-193.