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Kinematic dynamo of inertial waves WIETZE HERREMAN, PATRICE LE GAL, STEPHANE LE DIZES, IRPHE - Aix-Marseille University, ROTATING AND GEOPHYSICAL FLOWS TEAM — Inertial waves are natural oscillatory tridimensional perturbations in rapidly rotating flows. They can be driven to high amplitudes by an external oscillatory forcing such as precession, or by a parametric instability such as in the elliptical instability. Inertial waves were observed in a MHD-flow (Gans, 1971, JFM ; Kelley et al., 2008, GAFD) and could be responsable of dynamo action. For travelling waves, a constructive alpha-effect was identified (Moffatt, 1970, JFM), but it does not apply to confined inertial wave flows. Yet, recent numerical work demonstrated that precession driven MHD flows can sustain magnetic fields (Tilgner, 2005, POF; Wu & Roberts, 2008, GAFD). This motivates us to study more precisely how inertial waves can exhibit dynamo action. Using a numerical code in cylindrical geometry, we find that standing inertial waves can generate a kinematic dynamo. We show that the dynamo-action results from a second order interaction of the diffusive eigenmodes of the magnetic field with the inertial wave. Scaling laws are obtained, which allows us to to apply the results to flows of geophysical interest.

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