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Oscillating Dipolar Vortex Generated by Electromagnetic Stirring ALDO FIGUEROA, SERGIO CUEVAS, EDUARDO RAMOS, Centro de Investigacion en Energia, Universidad Nacional Autonoma de Mexico — The continuously driven laminar flow produced by an oscillating electromagnetic force in a thin electrolytic fluid layer is studied experimentally and numerically. The flow is generated by the interaction of an injected alternate electric current and a steady magnetic dipole field normal to the layer. Alternate currents with frequencies and amplitudes in the range of 10-50 mHz and 1-5 mA, respectively, are explored. The electromagnetic force stirs the fluid and produces an oscillating dipole vortex that enhances the fluid mixing. A numerical 2D solution of the full MHD equations that considers an analytical expression to model the non-uniform magnetic field is obtained. Numerical results show a good qualitative agreement with the experiments. Flow visualization and numerical particle tracking indicate that the mixing rate is increased although lateral transport seems to be inhibited due to symmetry conditions.

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