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Scaling and symmetry breaking in a vortex dipole M. DURAN-MATUTE, F. FONTENELE ARAUJO, R.R. TRIELING, G.J.F. VAN HEIJST, Fluid Dynamics Laboratory, Dept. of Applied Physics, Eindhoven University of Technology — A vortex dipole is experimentally studied in a layer of salt water driven by time independent electromagnetic forcing. In particular, we characterize the flow along the dipole axis by measuring the Reynolds number Re as a function of the Chandrasekhar number Ch (the ratio of Lorentz to viscous forces). We find $Re \sim Ch^{\alpha}$, with the scaling exponent α ranging from $\alpha = 1$ (viscous regime) to $\alpha = 1/2$ (advective regime). The underlying transition emerges as a symmetry breaking of the axial flow, which we quantify via the skewness of the axial velocity profile.

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