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Interaction of dipolar vortices with a shear flow: experimental results VITOR MARQUES ROSAS FERNANDES, LEON KAMP, HERMAN CLERCX, GERT-JAN VAN HEIJST, Eindhoven University of Technology — Interaction of large-scale flows with vortices is of fundamental and widespread importance in geophysical fluid dynamics and also, more recently for the dynamics of fusion plasma. More specifically the interplay between two-dimensional turbulence constituted by a collection of unsteady eddies and so-called zonal flows has gained considerable interest because of the relevance for transport and associated barriers. We present an experimental study with a two-fluid-layer setup of the interaction of Lamb-like dipolar vortices with a quasi-two-dimensional channel flow that is driven electromagnetically. Dipoles are injected into the sheared flow perpendicularly and obliquely. Using particle image velocimetry we evaluate the evolution of the dipolar vorticity. Results are confronted with two-dimensional numerical simulations. Dipoles turn out to be quite robust structures despite the shearing action imposed by the background flow.

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