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Interaction of monopolar and dipolar vortices with a shear flow: a numerical study LEON KAMP, VITOR MARQUES ROSAS FERNANDES, GERT-JAN VAN HEIJST, HERMAN CLERCX, 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 numerical results on the interaction of individual monopolar and dipolar vortices with typical sheared channel flows (Couette and Poiseuille). Contrary to monopolar vortices, dipolar ones tend to retain their compactness while propagating through the shear flow along curved pathways without much distortion. Simulations on the interaction of a driven turbulent field with mentioned channel flows are used to explore the suppression of turbulence and turbulent transport and the pronounced role played by the boundaries on these.

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