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Dynamics and deformation of interacting vortices in background shear PATRICK FOLZ, University of California, San Diego — Although the dynamics of a vortex under the influence of a background strain field and under that of another nearby vortex are often studied separately, in complex flows such as turbulence, both influences may be present simultaneously. This combined influence is here investigated by considering the fundamental case of a two-dimensional co-rotating vortex pair, having circulation ratio $= {}_1/_2 = (a_1/a_2)^2({}_1/_2)$, interacting in the presence of linear background shear, having vorticity ${}_S$ and relative strength $= {}_S/_2$. Numerical simulations are performed for viscous flow, and the main flow regimes, pairing and separation, are identified. This work focuses on vortex-dominated pairings: in this subregime, the vortices revolve with varying peak-peak distance b, causing the strain rate induced by each vortex on the other to vary in time, while the orientation of this vortex-induced strain rate relative to that of the fixed background shear also varies. This results in a periodic phenomenon in which the deformation of each vortex varies with the relative orientation of the vortices and the shear. This phenomenon and its effect on the subsequent interaction outcomes are examined and discussed.

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