Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

The influence of background shear on asymmetric vortex interactions PATRICK FOLZ, KEIKO NOMURA, University of California, San Diego — The influence of uniform background shear, $\alpha = dU/dy$, on a pair of like-signed viscous vortices with strength ratio, $\Lambda = \Gamma_1/\Gamma_2 \leq 1$, is investigated using two-dimensional numerical simulations. A shear strength parameter is defined, $\zeta = -\alpha/\omega_2$, where ω_2 is the peak vorticity of the stronger vortex. In shear-dominated flows, for sufficiently strong adverse shear ($\zeta < \zeta_{sep} < 0$), the vortices separate, and for strong magnitude shear ($|\zeta| > \zeta_{cr}$), both vortices are detrained and destroyed. The value of ζ_{sep} is found to vary with Λ in close agreement with a point-vortex model, while $\zeta_{cr} \approx 0.20$ is approximately constant in the parameter ranges considered. In vortex-dominated flows ($\zeta_{sep} < \zeta < \zeta_{cr}$), the vortices always interact to produce a single quasi-stable vortex. The post-interaction vortex is evaluated by an enhancement factor, $\varepsilon = \Gamma_{end}/\Gamma_{2,start}$. The interaction is considered a merger if $\varepsilon > 1$ and a straining out if $\varepsilon \approx 1$. The behavior of ε is effectively characterized by the ratio of starting vortex enstrophies, Z_2/Z_1, with key values comparable to the no-shear case.

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Date submitted: 01 Aug 2017 Electronic form version 1.4