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Elliptical Instability in Asymmetric Vortex Pairs DORIS STUMPS, KEIKO NOMURA, University of California, San Diego — The elliptical instability in two unequal counter rotating vortices is studied with numerical simulations for $\mathrm{Re}_\Gamma = 3100$. The initially Gaussian vortices with nearly equal circulation but unequal peak vorticity and core size are subjected to random perturbations, and their time evolution in the linear and weakly non-linear phases are examined. Asymmetry is achieved by simultaneously increasing core radius and lowering peak vorticity on one vortex while keeping the properties on the other vortex fixed between simulations. The effects of this asymmetry on the interaction between the two vortices are then studied, and it is found that deformation is more prominent on the larger vortex, which wraps around the smaller one; the most unstable wavenumber increases for increasingly asymmetrical cases; the global growth rate of the most unstable mode is higher in the weakly asymmetrical pair than the symmetrical pair, but the growth rate begins to decrease as the disparity in core size and peak vorticity becomes larger than a critical threshold. Details including vortex separation, relative inclination angle, and strain rate are presented.

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