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**Interactions of two unequal co-rotating viscous vortices in the presence of external shear** PATRICK FOLZ, KEIKO NOMURA, University of California, San Diego — The interaction of two co-rotating viscous vortices in linear background shear is investigated through two-dimensional numerical simulations. In general, equal co-rotating viscous vortices will merge if brought within a critical separation distance. This process occurs when the relative strain induced on one vortex by the other weakens it sufficiently, causing core fluid to detrain. The vortices are then mutually entrained and the flow transforms into a single vortex. In the absence of shear, when the vortices are unequal the outcome of the interaction is determined by the relative timing of core detrainment. Depending on the degree of asymmetry, merger may or may not occur. When background shear is present, advective motion of the vortices is altered. With sufficiently strong adverse shear, the vortices will separate. Otherwise, in the case of equal vortices, merger is enhanced or inhibited by favorable or adverse shear respectively. The onset of the merging process when shear is present is found to occur when the vortices reach the critical merging criterion for vortices without shear. For unequal vortices, the presence of the shear modifies the start of the detrainment process for each vortex and leads to varied outcomes.

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