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A numerical study of the hydrodynamic interaction of bubble pairs ascending in non-Newtonian liquids RODRIGO VELEZ, Universidad Nacional Autonoma de Mexico, PENGTAO YUE, Virginia Polytechnic Institute and State University , JAMES J. FENG, University of British Columbia, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico — This talk presents computational results on the interaction of a pair of bubbles immersed in non-Newtonian fluids. The Arbitrary Lagrangian-Eulerian (ALE) technique was used to simulate two bubbles rising in tandem or side by side in shear-thinning and Oldroyd-B fluids. In the shear-thinning fluid, the pairwise interaction is affected by the the Eotvos and Reynolds numbers as well as the initial orientation of two bubbles. In particular, two in-line bubbles will rise together and form a doublet as the trailing bubble catches up with the leading one. In a viscoelastic fluid, a negative wake may appear depending on the initial separation between the bubbles. The capillary number, which can be an indicator of the bubble deformability, seems to play a secondary role in the bubble interaction. The numerical simulations complement previous experiments done with bubble swarms by our group.

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