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Three-dimensional stability of dipole-wall interactions CHRISTOPHER SUBICH — The interaction of a dipole colliding with a no-slip boundary has been well studied in two dimensions at both low (Orlandi, 1990) and moderate (Kramer, 2007) Reynolds numbers, and just such a case is advocated as a benchmark for numerical simulations (Clercx, 2006). However, in three-dimensional flow the vortex pair has a short-wavelength elliptic instability (Leweke, 1997) that ultimately destroys the two-dimensional character of the vortex pair. For small enough perturbations, however, a dipole can complete a partial rebound from a no-slip wall before the elliptic instability dominates its evolution. The small-scale vorticity generated in the collision creates a different character to the instability. This work presents the results of three-dimensional pseudospectral numerical simulations of the instability at a Reynolds Number of 1,250.

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