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Dynamics and Interactions of Jovian Vortices During the Last Year¹ PHILIP MARCUS, XYLAR ASAY-DAVIS, SUSHIL SHETTY, UC Berkeley — Jupiter’s atmosphere has been active during the last year with the Great, Little, and Oval Red Spots merging, almost merging, or repelling each other. These jovian storms are all anticyclonic vortices, with small Rossby numbers, embedded in an atmosphere with strong vertical stratification and horizontal shear. We use numerical and analytic models to compute and explain these vortex interactions. Many of the interactions are sensitive to equilibrium values of the ambient jovian atmosphere that are difficult to measure directly, such as the vertical shear and the vertical stratification. We show that the errors in the velocity measurements of the jovian vortices are sufficiently small, the equations are sufficiently well-conditioned, and the 3D models of the vortices sufficiently complex that the “inverse problem” can be solved and that we can determine many of the equilibrium values of the ambient jovian atmosphere.

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Philip Marcus
pmarcus@me.berkeley.edu
UC Berkeley

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