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How Do 3D Vortices Spin Down, or Do They? PEDRAM HASSANZADEH, SUYANG PEI, PHILIP MARCUS, University of CA at Berkeley — It is well known that laminar 3D vortices sandwiched between upper and lower boundaries in a rapidly rotating flow will rapidly spin down due to Ekman pumping. The pumping transports angular momentum and energy out of the vortex and into thin boundary layers where viscosity acts efficiently. On the other hand the Great Red Spot of Jupiter and laboratory models of the Red Spot, which are 3D vortices sandwiched between upper and lower boundaries in a rapidly rotating tank, do not spin down. Those 3D vortices maintain themselves indefinitely. The longevity of the Red Spot has been attributed to angular momentum transfer from its surrounding shearing flow, from its mergers with smaller vortices, and to a number of other processes, none of which have been verified and all of which lack plausibility. The reasons behind the longevity of "Red Spots" in the laboratory have never been examined. We present numerical results that show how a laboratory model of the Red Spot maintains itself and does not spin down.

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