Abstract Submitted
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Jovian vortices by simulated annealing[1] P. J. MORRISON, University of Texas at Austin, G. R. FLIERL, R. V. SWAMINATHAN, MIT — We explore the conditions required for isolated vortices to exist in sheared zonal flows and the stability of the underlying zonal winds. This is done using the standard 2-layer quasigeostrophic model with the lower layer depth becoming infinite; however, this model differs from the usual layer model because the lower layer is not assumed to be motionless but has a steady configuration of alternating zonal flows [1]. Steady state vortices are obtained by a simulated annealing computational method introduced in [2], generalized and applied in [3] in fluid flow, and used in the context of magnetohydrodynamics in [4,5]. Various cases of vortices with a constant potential vorticity anomaly atop zonal winds and the stability of the underlying winds are considered using a mix of computational and analytical techniques. [1] A.P. Stamp and T.E. Dowling, J. Geophys. Res. **98**, 847 (1993). [2] G.K. Vallis, G. Carnevale, W.R. Young, J. Fluid Mech. 207 (1989) 133. [3] G. Flierl and P. Morrison, Physica D **240**, 212 (2011). [4] M. Furakawa and P. J. Morrison, Plasma Phys. Control. Fusion **59**, 054001 (2017). [5] C. Bressan, M. Kraus, P. J. Morrison, O. Maj, and E. Sonnendrücker, poster contribution DPG Bremen Conference (2017)

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