

Abstract Submitted
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Shock-producing Convection in Hot Jupiter Atmospheres¹ WHITNEY POWERS, University of Colorado - Boulder, EVAN ANDERS, Northwestern University, BEN BROWN, University of Colorado - Boulder, JEFF OISHI, Bates College, DANIEL LECOANET, Princeton University — Observations and models suggest that Hot Jupiters have supersonic jets which produce shocks in their upper atmospheres. Models also predict that there is a high Mach number convection zone deep in the atmospheres of these planets. In this work, we study stratified, high Mach number convection in conditions appropriate for the deep atmospheres of hot Jupiters. We use the Dedalus pseudospectral framework to study a set of fully compressible convection simulations at high Mach number. At sufficiently high levels of turbulence, we observe shocks launching from convective downflow lanes. We identify the conditions where shocks occur in our simulations, discuss what effects they have on atmospheric dynamics, and how our model atmospheres can be extrapolated out to more realistic models.

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