

Abstract Submitted  
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**Critical Tunneling Currents in Quantum Hall Superfluids:  
Pseudospin-Transfer Torque Theory** JUNG-JUNG SU, Theoretical Division,  
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Physics, The University of Texas at Austin — At total filling factor  $\nu = 1$  quantum  
Hall bilayers can have an ordered ground state with spontaneous interlayer phase  
coherence. The ordered state is signaled experimentally by dramatically enhanced  
interlayer tunnel conductances at low bias voltages; at larger bias voltages the inter-  
layer currents are similar to those of the disordered state. We associate this change  
in behavior with a Josephson-like critical current beyond which static inter-layer  
phase differences cannot be maintained, and examine the dependence of this critical  
current on sample geometry and on the phase stiffness and phase order parameters  
that characterize the system at long wavelengths. Our analysis is based in part  
on analogies between coherent bilayer behavior and spin-transfer torque physics in  
metallic ferromagnets.

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