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Real Spin in Pseudospin Quasiparticles of Bilayer Quantum Hall systems BAHMAN ROOSTAEI, University of Oklahoma, H. A. FERTIG, Indiana University, KIERAN MULLEN, University of Oklahoma — Recent experiments have observed enhanced nuclear spin relaxation in double layer quantum Hall systems near the phase boundary between compressible and incompressible states(1). We investigate the electronic spin structure of such systems by calculating the groundstate close to $\nu = 1$ using the Hartree-Fock approximation. This state is a quasiparticle lattice, and we examine the possibility of optimizing its energy by allowing the real spin to tilt away from the majority direction in the quasiparticle cores, analogous to what has been suggested in field theoretic studies of single quasiparticles(2). A broken symmetry of these states introduces low energy spin modes which may couple to the nuclear spins. We calculate both the spin and pseudospin textures for the system near the transition and discuss whether they can account for the observed relaxation rates.
1) I.B. Spielman et al., cond-mat/0410092; N. Kumada et al., cond-mat/0410495
2) S. Ghosh and R. Rajaraman, Phys. Rev. B63, 035304 (2001); Z.F. Izawa and G. Tsitsishvili, cond- mat/0311406.
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Bahman Roostaei
University of Oklahoma

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