

Abstract Submitted
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Generalized Clustered Quantum Hall States STEVEN H. SIMON, Lucent Technologies, NIGEL R. COOPER, Cambridge University, ED REZAYI, California State University, Los Angeles — The Read-Rezayi (parafermion) quantum Hall states[1] for bosons can be defined as states where the wavefunction does not vanish when g bosons come together to the same point, but does vanish as z^2 as a $g + 1$ st particle approaches that point. These states can equivalently be defined as the unique ground state of a point contact $g + 1$ particle interaction Hamiltonian. Interestingly, the series of Read-Rezayi states appears to describe well the ground-states of rotating Bose condensates with point-contact two body interactions at a series of filling fractions [2]. If one attaches a Jastrow factor to such bose wavefunctions, one obtains fermion wavefunctions that may occur in electronic quantum Hall systems including the ($g = 2$) Pfaffian [3] and the ($g = 3$) $\nu = 13/5$ Read-Rezayi state [1]. In this work, we consider generalized cluster wavefunctions defined by the algebraic manner in which a wavefunction vanishes as $g + 1$ particles coalesce. We find Hamiltonians that generate these wavefunctions as their exact ground state. Among this series of states is the previously studied Haffnian wavefunction[4] and a host of states not previously discussed. We catalogue and study the new states and discuss whether any of them might occur in actual physical systems. [1] N. Read and E. Rezayi, PRB**59**, 8084 (1999). [2] N. R. Cooper, N. K. Wilkin, and J. M. F. Gunn, PRL**87**, 120405 (2001) [3] G. Moore and N. Read, Nuc. Phys. B**360**, 362 (1991). [4] D. Green, PhD Thesis.

Steven H. Simon
Lucent Technologies

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