

Abstract Submitted
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Fractional Quantum Hall Effect and Electron Correlations in Partially Filled First Excited Landau Level GEORGE SIMION, JOHN J. QUINN, Department of Physics, University of Tennessee — The possibility of using non-Abelian quasiparticle excitations in quantum computing has led to a revival of interest in the fractional quantum Hall (FQH) states of excited Landau levels. We present a quantitative study of most prominent incompressible quantum Hall states in the partially filled first excited Landau level (LL1) which have been recently studied experimentally by Choi et al.(cond-mat:0707.0236v2). The pseudopotential describing the electron- electron interaction in LL1 is harmonic at short range. It produces a series of incompressible states which is different from its LL0 counterpart. The numerical data indicate that the most prominent states $\nu = \frac{5}{2}, \frac{7}{3},$ and $\frac{8}{3}$ are not produced by Laughlin correlated electrons, but result from a tendency of electrons to form pairs or larger clusters which eventually become Laughlin correlated. States with smaller gaps at filling factors $\frac{14}{5}, \frac{16}{7}, \frac{11}{5}, \frac{19}{7}$ are Laughlin correlated electrons or holes and fit Jain's sequence of filled CF^4 levels.

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