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Correlations in incompressible quantum liquid states: constructions of electronic trial wavefunctions JOHN QUINN, University of Tennessee, Knoxville — Numerical studies indicate that incompressible quantum Hall states occur when the relation between the single particle angular momentum l and the number N of electrons in the partially filled Landau level is $2l = \nu^{-1}N - c_\nu$. Here, ν is the filling factor and c_ν is a "finite size shift." The values of c_ν found numerically depend on correlations, and for $\nu = p/q \leq 1/2$ are given by $c_\nu = q + 1 - p$. This finite size shift points the way to constructing electronic trial wavefunctions. A trial wavefunction can always be written $\Psi = FC$, where $F = \prod_{i<j} z_{ij}$ and $C(z_{ij})$ is a symmetric correlation function caused by interactions. For the Moore-Read state, $C_{MR}(z_{ij})$ is a product of F and the antisymmetric Pfaffian. C_{MR} is not the only possible correlation function for this state. Another choice is the quadratic function $C_Q = S\left\{\prod_{i<j\in g_A}\prod_{k<l\in g_B}(z_{ij}z_{kl})^2\right\}$, where S is a symmetrizing operator, and g_A and g_B each contain $N/2$ particles resulting from a partition of N into two sets. For the Jain states (e.g. $\nu = 2/5$), different partitioning of N particles into sets of unequal size gives appropriate correlation functions.

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