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Variational Monte Carlo study of the nematic state at half-filled Landau level of the two dimensional electron gas QUOC DOAN, Florida State University, EFSTRATIOS MANOUSAKIS, Florida State University, Center for Materials Research and Technology — The nematic state of 2DEG at half-filled Landau level (LL) is investigated using the variational Monte Carlo method. The wavefunction used has Jastrow correlations of the form $\prod_{i<j}(z_i - z_j)^2$ and a Slater determinant having an elliptical Fermi sea. We use the unprojected version of the wavefunction and apply the Monte Carlo (MC) method to calculate the pair distribution functions and the optimum energies. We compare optimum energies of the nematic state obtained by MC and Fermi hypernetted chain (FHNC/0) approximation with the optimum energies of the stripe ordered state obtained by Hartree-Fock. We find that both FHNC/0 and MC suggest that the the nematic state may be energetically favorable as compared to the stripe ordered state at 2^{nd} LL. We have obtained the exact projection of the above mentioned wavefunction of the nematic phase onto the lowest LL. We are in the process of comparing the results obtained with the exact wavefunction on small size systems to those obtained without the projection.

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