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Variational studies of nematic phase of half-filled Landau level 2 dimensional electron gas (2DEG) system QUOC DOAN, MARTECH and Physics Department, FSU, Tallahassee, FL, EFSTRATIOS MANOUSAKIS, MARTECH and Physics Department, FSU, Tallahassee, FL and University of Athens, Greece — We study the ground state of a nematic phase of the 2DEG at filling fraction $\nu = 1/2$. The pair distribution function and the interaction energy are calculated using a variational wavefunction having Jastrow pair-correlations of the form $\Pi_{i<j}(z_i - z_j)^2$ and an elliptical Fermi surface. The ratio between the major and minor axes of the ellipse is used as the broken symmetry parameter. First we used the Fermi hypernetted chain (FHNC/0) approximation and we find that for strong enough magnetic field and below a critical value of the broken symmetry parameter the nematic phase is energetically favorable. We find that the nematic phase can be realized when the energy difference between the nematic and the symmetric phase are of the same order of magnitude to the characteristic temperature below which the anisotropic transport in 2DEG was observed. Furthermore, the Monte Carlo (MC) method was used to calculate the energy and the pair distribution function using the same wavefunction in order to verify the accuracy of these results. The comparison of the results obtained with FHNC/0 and MC will be presented at the meeting.

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