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Pomeranchuk Instability driven by Coulomb interaction in half-filled Landau levels JUNPING SHAO, Cornell University, EDWARD REZAYI, Cal State LA, EUN-AH KIM, Cornell University — We study the Coulomb interaction driven Pomeranchuk instability as a mechanism for observed electronic nematic phases at high Landau levels. Such a mechanism will be signaled by the instability of the Fermi surface to quadripolar deformations: $F_2 < -1$, where F_2 is the Fermi liquid parameter for the angular momentum $L = 2$ channel. We compare the Fermi Liquid parameters for the lowest three half-filled Landau levels ($\nu = 1/2, 5/2 and 9/2$). We calculate the Fermi liquid parameters by evaluating energies of eight independent particle-hole pair excitation configurations using a quantum Monte Carlo algorithm through correlated sampling. We used composite fermion many-body wave functions for 37 electrons on a toroidal geometry that are interacting through the Coulomb potential. We find F_2 to become increasingly negative as we go to higher Landau levels. This is consistent with experimental observations.

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