Spin structures in inhomogeneous fractional quantum Hall systems

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Discovery of the huge longitudinal magnetoresistance (HLM) phenomenon [1] opened new promising ways to measure indirectly nuclear spin polarization in GaAs/GaAlAs heterostructures by means of conductivity measurements rather than by e.g. NMR [2]. The HLM has been experimentally studied on high–mobility two–dimensional electron gases in the fractional quantum Hall regime (filling factor $\frac{2}{3}$) where the ground state is known to be spin unpolarized for lower magnetic fields and spin polarized for higher magnetic fields [3]. Although there are strong hints that the phenomenon appears due to formation of domains of spin polarized and spin unpolarized states there is neither theoretical nor experimental evidence for this model so far.

We report on finite size calculations based on the standard model developed by Yoshioka *et al.* [4] with a magnetic inhomogeneity added. We study the spin structures appearing in the ground state near the critical field where spin polarization of the ground state changes in a homogeneous system.

References

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