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Hysteretic resistance spikes in magnetic 2DEGs[1] J. CARLOS EGUES, HENRIQUE FREIRE, Instituto de Fisica de Sao Carlos, Universidade de Sao Paulo — We use spin-density-functional theory to study recently reported hysteretic magnetoresistance ρ_{xx} spikes in Mn-based 2D electron gases [Jaroszyński *et al.* Phys. Rev. Lett. **89**, 266802 (2002)]. We find hysteresis loops in our calculated Landau fan diagrams and total energies signaling quantum-Hall-ferromagnet phase transitions. Spin-dependent exchange-correlation effects are crucial to stabilize the relevant magnetic phases arising from *distinct* symmetry- broken excited- and ground-state solutions of the Kohn-Sham equations. Besides hysteretic spikes in ρ_{xx}, we predict *hysteretic dips* in the Hall resistance ρ_{xy}. Finally, we note that our theory *does not* include domain walls. While not ruling out the importance of these, our quantitative agreement with the experiments does highlight the relevance of spin-dependent exchange-correlation effects in magnetic 2DEGs.

[1]FAPESP

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