Hysteretic resistance spikes in magnetic 2DEGs\textsuperscript{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 $\rho_{xx}$ spikes in Mn-based 2D electron gases [Jaroszyński \textit{et al.} Phys. Rev. Lett. \textbf{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 \textit{distinct} symmetry-broken excited- and ground-state solutions of the Kohn-Sham equations. Besides hysteretic spikes in $\rho_{xx}$, we predict \textit{hysteretic dips} in the Hall resistance $\rho_{xy}$. Finally, we note that our theory \textit{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.

\textsuperscript{1}FAPESP

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