



Thursday, 16th February 2023, 17.15 h
Lecture Hall III, Department of Physics, Garching

Dynamical Spin Geometry and Spin Topology
on the Nanoscale

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Abstract:

I will present our recent results on the electromagnetic response of electron gases coupled to moving magnetic spin textures. Dynamically fluctuating magnetic moments strongly impact the flow of conduction electrons in solids, here exemplified by:

(1) Emergent Inductance of spiral magnets, where an electric current populates low-lying excitations of the spin texture by spin-transfer torque, temporarily depositing energy. The back-action of the driven spiral onto the electron gas generates a phase-delayed voltage (emergent inductance) [1,2].

(2) Spin geometry and topology of correlated paramagnets in the thermally disordered regime, where chiral interactions – for example of the Dzyaloshinskii-Moriya type – generate a finite expectation value for the ‘scalar’ spin chirality $\langle \mathbf{S} \cdot (\mathbf{S} \times \mathbf{S}) \rangle$, although the time-average of $\langle \mathbf{S} \rangle$ is fully collinear [3-5].

[1] N. Nagaosa, Jpn. J. Appl. Phys. 58, 120909 (2019)

[2] T. Yokouchi et al., Nature 586, 232–236 (2020)

[3] W.-T. Hou et al., Phys. Rev. B 96, 140403(R) (2017)

[4] K. Kolincio, M. Hirschberger et al., PNAS 118, e2023588118 (2021)

[5] K. Kolincio, M. Hirschberger et al., Physical Review Letters (in print); arXiv:2206.05756 (2022)

There will be coffee, tea, and cookies in front of the lecture hall at 17.00 h