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Nonlocal-to-local analysis of energies in Micromagnetics

Wednesday, June 26, 2024 10:00 AM (30 minutes)

In this talk we first consider the nonlocal-to-local convergence of exchange energy functionals in Micromagnetics, extending the Bourgain-Brezis-Mironescu formula in order to encompass the scenario where also antisymmetric contributions are encoded.
In a first stage, the nonlocal approximation is given by a pointwise convergence result, obtaining as byproduct a rigorous justification of the so-called Dzyaloshinskii-Moriya interaction term. Then, also a Gamma-convergence argument is presented.
In the remaining time of the talk, in the modified setting where the nonlocal exchange interactions replace the classical local ones, we focus on the existence of minimizers for the micromagnetic energy functional.
Finally, by means of a nonlocal Poincaré-type inequality, we exhibit some conditions to obtain constant minimizing configurations in the spirit of the so-called Brown's Fundamental Theorem.

This is a joint work with E. Davoli, G. Di Fratta and L. Lombardini.

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