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Energy concentration in a two-dimensional magnetic skyrmion model

Thursday, 16 October 2025 11:30 (45 minutes)

In this talk, I present the formation of singularities in a chiral Skyrme-type energy model, which describes magnetic solitons in two-dimensional ferromagnetic systems. In the presence of a diverging anisotropy term, which enforces a preferred background state of the magnetization, I show how to establish a weak compactness result for the topological charge density and prove that it converges to an atomic measure with quantized weights. I characterize the Γ-limit of the energies as the total variation of this measure.

Then, I consider the case of lattice-type energies and prove a corresponding compactness
and Γ-convergence result. To this end, I will first carefully define a notion of discrete topological charge for S2 -valued maps.

This is a joint work with Marco Cicalese and Leonard Kreutz.

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