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Diffuse decay of excess in codimension two

Wednesday, 5 November 2025 16:30 (1 hour)

Entire critical points of the Abelian-Higgs functional are known to blow down to (generalized) minimal submanifolds of codimension 2. We focus on the multiplicity-one regime, where the blow-down consists of a single sheet. In this talk, I will present results from three papers that together provide the analytical tools to prove that entire critical points in this regime exhibit an improvement of flatness, leading to the uniqueness of blow-downs.
We further show that stationary points are flat in low dimensions, using an Allard-type argument, while local minimizers are flat in all dimensions via a De Giorgi-type method. This can be viewed as a large-scale regularity theorem in the spirit of geometric measure theory.
As part of this analytical framework, I will briefly discuss weighted inequalities on two-manifolds, as well as a quantitative stability theorem for the Abelian-Higgs model in dimension 2. This is a joint work with Guido De Philippis and Alessandro Pigati.

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