

Local minimizers with unbounded vorticity in 2d Ginzburg-Landau

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It is known that superconductors possess hysteretic properties that yield vortex configurations with N vortices, for N much different from that present in a global minimizer. In Ginzburg-Landau theory, it is conjectured that local minimizers with prescribed vorticity exist for a range determined by the applied field and the domain. Treating very large vorticities is a challenging problem, and for this reason the best results until recently only cover slowly diverging number of vortices, that is for number of vortices no greater than $|\log \epsilon|$. In joint work with R.L. Jerrard we prove the existence of local minimizers covering almost the whole expected range, for strengths of the applied field of up to a power of $1/\epsilon$. In particular our results show the existence of minimizers with N as large as a power of $1/\epsilon$ for large enough fields.

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