

## Canonical Ginzburg-Landau limits on graphs

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Alexander and deGennes (dGA) proposed in the early 80s to analyze thin elongated superconducting samples by a one dimensional linear Schrodinger equation. The dGA model explained a number of experimental results and predicted new effects, in particular in relation to phase transitions and to the zero set of the order parameter. A rigorous derivation on the dGA model for domains collapsing to graphs was given about 10 years ago. The limit was achieved under the assumptions that the fattened domain around the graph is smooth, and that all the problem's parameters, except for the domain's thickness, are uniformly bounded. Since then I developed with my colleagues (Richardson, Sternberg and Wolansky) other canonical models. We explored different regimes in the parameter spaces (large magnetic fields or small Ginzburg Landau parameter) and different geometric settings. In the talk I shall survey these models and their applications to different problems in superconductivity and to other areas.