

1036-35-179

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In this talk, I will describe a joint work with F.H.Lin and X.B.Pan on the asymptotics of the Ginzburg-Landau energy

$$E_\epsilon(u) = \int_\Omega \frac{1}{2} |\nabla u|^2 + \frac{1}{\epsilon^2} F(u), \Omega \subset R^n,$$

where $F(p)$ is roughly the distance function to $N = N_1 \cup N_2$, where N_1, N_2 are two disjoint submanifolds in R^k . By suitably designing the boundary data $g : \partial\Omega \rightarrow R^k$, we show that

$$\min E_\epsilon(u) = \frac{c_0 A_0}{\epsilon} + o\left(\frac{1}{\epsilon}\right),$$

where A_0 is the area of the interface which is a minimal hypersurface, and c_0 is roughly the minimal energy of standing waves between N_1 and N_2 . I will also discuss the second order expansion of E_ϵ and some results on the dynamics. (Received January 22, 2008)