# A Γ-convergence result for non-self dual U(1)-Yang–Mills–Higgs energies of Ginzburg–Landau type

*Tuesday, July 5, 2022 4:00 PM (30 minutes)*

Let $E \to M$ be a Hermitian complex line bundle with structure group $U(1)$ over a closed smooth orientable connected Riemannian manifold $M$. Fix a smooth metric connection $D_0$ on $E$ and consider, for $\varepsilon > 0$, the non-self dual $U(1)$-Yang–Mills–Higgs energies

$$G_\varepsilon(u_\varepsilon, A_\varepsilon) := \int_M \frac{1}{2}|D_{A_\varepsilon} u_\varepsilon|^2 + \frac{1}{4\varepsilon^2}\left(1 - |u_\varepsilon|^2\right)^2 + \frac{1}{2}|F_{A_\varepsilon}|^2 \, \mathrm{vol}_g,$$

where $(u, A) \in W^{1,2}(M, E) \times W^{1,2}(M, T^*M)$, $D_A := D_0 - iA$, and $F_A$ denotes the curvature form of $D_A$. The functionals $G_\varepsilon$ arise as natural generalisation of the usual Ginzburg–Landau energy on domains of $\mathbb{R}^n$.

The aim of the talk is to illustrate the following Γ-convergence result, obtained in collaboration with G. Canevari and G. Orlandi (Università di Verona): as $\varepsilon \to 0$, the rescaled functionals $\frac{G_\varepsilon}{|\log \varepsilon|}$ Γ-converge, in the flat topology of Jacobians, to ($\pi$ times) the codimension two area functional.

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