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Isolated singularities of Yang-Mills-Higgs fields on surfaces. (English) Zbl 1473.53044

Summary: We study isolated singularities of 2D Yang-Mills-Higgs (YMH) fields defined on a fiber bundle, where the fiber space is a compact Riemannian manifold and the structure group is a compact connected Lie group. In general, the singularity cannot be removed due to possibly non-vanishing limit holonomy around the singular points. We establish a sharp asymptotic decay estimate of the YMH field near a singular point, where the decay rate is precisely determined by the limit holonomy. Our result can be viewed as a generalization of the classical removable singularity theorem of 2D harmonic maps.

MSC:
53C07 Special connections and metrics on vector bundles (Hermite-Einstein, Yang-Mills)
58E15 Variational problems concerning extremal problems in several variables; Yang-Mills functionals

Keywords:
Yang-Mills-Higgs functional; limit holonomy; twisted harmonic map; balanced temporal gauge; Poincaré inequality

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