Stability of critical points of the self-dual abelian YMH energy on Kähler manifolds

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Recent works by Pigati-Stern and Philippis-Pigati on general closed, oriented Riemannian manifolds, have shown a deep relation between critical points of the abelian Yang-Mills-Higgs (YMH) energy and codimension 2 minimal submanifolds, via an energy concentration phenomenon for sequences of critical points with uniformly bounded energy. When the manifold is Kähler, it is well-known that the critical point equations admit special first order solutions, so-called vortices, which are in fact the absolute minimizers for the abelian YMH energy. These solutions concentrate along complex subvarieties, which in turn are the minimizers for the volume functional in this context. In view of these facts, it would be interesting to try to understand the concrete links between the Morse theories for the abelian YMH energy and the volume functional in codimension 2. In this talk, we explain a generalization of recent works by Cheng and Nagy-Oliveira on the relation between stable critical points of the abelian YMH energy and vortices, aimed at obtaining an analogue of the classical Lawson-Simons theorem, which characterized stable critical points of the volume functional in the complex projective space as complex subvarieties.

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