

课程介绍

课程题目：SHORT COURSE ON HIGGS BUNDLES AND LOCAL SYSTEMS

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课程简介：

Higgs bundles and local systems, are two core objects in nonabelian Hodge theory. The classical nonabelian Hodge theory (means the base is a projective variety, or more general a compact Kähler manifold), is known as a theory dealing with the passage from Higgs bundles to local systems. Such correspondence, especially at the level of categories, is mainly based on the fundamental work of Donaldson, Corlette, Hitchin, and Simpson, as well as the well-known Riemann–Hilbert correspondence. More precisely, over a compact Kähler manifold, we have a categorical correspondence between (poly)stable Higgs bundles of fixed rank and vanishing all the Chern classes, and (semi)simple local systems of the same rank, and (semi)simple flat connections of the same rank.

课程安排：

This short course is a basic course aimed on the introduction to this theory in the categorical point of view. I will divide it into the following parts (not mean each part will take 1 course):

- (1) Overview of the course;
- (2) Complex geometry (Kähler manifolds, vector bundles, cohomologies, Hodge theory);
- (3) Affine GIT (algebraic groups, group actions on affine varieties, quotients and affine GIT);
- (4) Betti spaces (local systems, irreducibility, constructing the moduli space via affine GIT);
- (5) De Rham spaces (flat connections, Riemann–Hilbert correspondence, (pluri-harmonic) metrics);
- (6) Dolbeault spaces (Higgs bundles, (pluri-)harmonic metrics, harmonic bundles and the correspondence);
- (7) Proof on the existence of (pluri-)harmonic metrics;
- (8) Other topics (Hitchin morphism, C^* -action, λ -connections and twistor spaces, etc)

具体详情见：

<http://www.cim.nankai.edu.cn/2022/0627/c11453a460256/page.htm>