



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

MATHEMATICS COLLOQUIUM

Non-abelian Hodge theory and the P=W conjecture

By

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Abstract

Given a compact Riemann surface, nonabelian Hodge theory relates topological and algebro-geometric objects associated to it. Specifically, complex representations of the fundamental group are in correspondence with algebraic vector bundles, equipped with an extra structure called a Higgs field. This gives a transcendental matching between two very different moduli spaces associated with the Riemann surface: the character variety (parameterizing representations of the fundamental group) and the Hitchin moduli space (parameterizing Higgs bundles). In 2008, de Cataldo, Hausel, and Migliorini proposed the P=W conjecture, which gives a precise link between topology of the Hitchin space and Hodge theory of the character variety, imposing surprising constraints on each side. I will introduce the conjecture, review its recent proofs, and discuss how the geometry hidden behind the P=W phenomenon is connected to other branches of mathematics.

Date : 10 May 2024 (Friday)

Time : 3:00pm – 4:00pm

Venue : Lecture Theater F (Lifts 25/26)

All Are Welcome!