

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Non-Abelian Hodge Theory, Zeros of Holomorphic One-Forms, and Generic Vanishing

By

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This dissertation is a compilation of the results from two related research projects undertaken by the author.

In the first, I give a new proof that every holomorphic one-form on a smooth complex projective variety of general type must vanish at some point, first proven by Popa and Schnell using generic vanishing theorems for Hodge modules.

In the second, I give a new proof of a theorem by Pareschi, Popa and Schnell that the direct image of the canonical bundle of a smooth projective variety along a morphism to an abelian variety admits a Chen-Jiang decomposition, without using the theory of Hodge modules.

Both projects relate to cohomology jump loci in the moduli space of rank one Higgs bundles, and involve applying Simpson's results on the structure of these loci. I give a largely self-contained introduction to these results.

Date: April 24, 2023

Time: 2:00pm

Place: Math Tower room 5-127

Program: Mathematics

Dissertation Advisor: Christian Schnell