Hao Sun

hsun71275@scut.edu.cn
381 Wushan St, Guangzhou, Guangdong, China

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Research Interests

Primary research interest is *algebraic geometry*. When I was Ph.D, I focused on *Hurwitz number*. Now I am working on *Higgs bundles* and its related field from the viewpoint of algebraic geometry.

Employment

Assistant Professor, South China University of Technology, 2020-Present

Postdoc, Sun Yat-Sen University
Mentor: Changzheng Li 2018 - 2020

Education

Ph.D., University of Illinois at Urbana-Champaign
Advisor: Maarten Bergvelt 2012-2018

B.S., South China University of Technology, 2008-2012

Publications
Preprints

All of the papers have an arXiv version (with identifier "sun underscore h underscore 4"), which might be different from the published version.

1. A formula about W-operator and its application to Hurwitz number, *Discrete Math.* 342(3), 715-722 (2019).
2. Degree of the W-operator and Noncrossing Partitions, *Bull. Aust. Math. Soc.* 101(2), 186-200 (2020).
3. Deformation of Locally Free Sheaves and Hitchin Pairs over Nodal Curve, *J. Korean Math. Soc.* 57(4), 809-823 (2020).
4. Topological invariants of parabolic G-Higgs bundles (with G. Kydonakis and L. Zhao) *Math. Z.* 297(1), 585-632 (2021).
5. The Beauville-Narasimhan-Ramanan correspondence for twisted Higgs V-bundles and components of parabolic $Sp(2n, R)$-Higgs moduli, (with G. Kydonakis and L. Zhao) *Trans. Amer. Math. Soc.* 374(6), 4023-4057 (2021).
6. Moduli Problem of Hitchin Pairs over Deligne-Mumford Stack, *Proc. Amer. Math. Soc.* 150(1), 131-143 (2022).
7. Monodromy of Rank 2 Parabolic Hitchin Systems, (with G. Kydonakis and L. Zhao) *J. Geom. Phys.* 171, Paper No. 104411, 18pp (2022).
8. Moduli Space of Λ-modules on Projective Deligne-Mumford Stacks, arXiv: 2003.11674 (2020).
9. Poisson Structures on Moduli Spaces of Higgs Bundles over Stacky Curves, (with G. Kydonakis and L. Zhao) arXiv:2008.12518 (2020).
10. Moduli Spaces of Coherent Sheaves on Projective Deligne-Mumford Stacks over Algebraic Spaces, arXiv:2101.00377 (2021).
11. On the image of Hitchin morphism for algebraic surfaces: The case GL_n, (with L. Song) arXiv:2107.01679 (2021).

12. Tame Parahoric Higgs Bundles for a Complex Reductive Group,
(with G. Kydonakis and L. Zhao) arXiv:2107.01977 (2021).
13. Tame Parahoric Nonabelian Hodge Correspondence in Positive Characteristic over Algebraic Curves,
(with M. Li) arXiv:2109.00850 (2021).
14. Tame Parahoric Nonabelian Hodge Correspondence for Complex Reductive Groups on Algebraic Curves,
(with P. Huang, G. Kydonakis and L. Zhao) to appear.

Teaching Experience

- Calculus I (Math 151 in Rutgers adjoint with SCUT) Spring 2022
- Linear Algebra and Analytic Geometry (SCUT)
Calculus I (Math 151 in Rutgers adjoint with SCUT)
Basic Calculus (Math 135 in Rutgers adjoint with SCUT) Fall 2021
- Calculus II (Math 152 in Rutgers adjoint with SCUT) Spring 2021
- Finite Math (Math 124, UIUC) Fall 2017
- Calculus II (Math 231, UIUC) Spring 2017
- Calculus II (Math 231, UIUC) Fall 2016
- Calculus I (Math 221, UIUC) Fall 2015

Talks

- On the Image of Hitchin Morphism for Algebraic Surfaces
Chern Institute NanKai University August 2021
- Moduli Space of Coherent Sheaves on Root Stacks
Geometry Seminar, *Shanghai Normal University* November 2020
- Moduli Space of Hitchin pairs over Deligne-Mumford Stack
Geometry Seminar, *Fudan University* November 2019
- Moduli Space of Hitchin pairs over Deligne-Mumford Stack
Topology and Geometry Seminar, *HUST* September 2019
- Connected Components of the Moduli Space of Parabolic Sp(2n,R)-Higgs Bundles
Geometry Seminar, *Chern Institute Nankai University* March 2019
- W-Operators and Hurwitz Numbers
UIUC Representation Theorey Seminar, *UIUC* September 2017
- W-Operator and a Generating Function of Hurwitz Numbers
AMS Sectional Meeting, *University at Buffalo* September 2017