Hao Sun

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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.

Education

- Ph.D., University of Illinois at Urbana-Champaign   2013-2018
  Advisor: Maarten Bergvelt
- M.A.[1], University of Illinois at Urbana-Champaign   2012-2013
- B.S., South China University of Technology,   2008-2012

Professional Experience

- Associate Professor[2], South China University of Technology,   2020-now
- Postdoc, Sun Yat-Sen University   2018 - 2020
  Mentor: Changzheng Li

Research Visit

- Institute of Geometry and Physics   March – May, 2023
- Oberwolfach Research Institute for Mathematics, No. 2424q   June, 2024
- Center International de Rencontres Mathématiques, No. 3273   July, 2024[3]

Fundings

- Guangdong Basic and Applied Basic Research Foundation   2020-2022
  No. 2019A1515110961
- National Natural Science Foundation of China (NSFC)   2022-2024
  No. 12101043
- National Key R&D Program of China   2023-2027
  No. 2022YFA1006600 (hosted by Qiongling Li)
- Guangdong Basic and Applied Basic Research Foundation   2024-2026

Publications Preprints

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).

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[1] I transferred from master program to Ph.D program in 2013 without obtaining a master degree. Prof. Laugesen, who was the director of graduate studies at UIUC, told me that it does not matter, do not worry about it. I am also curious about whether I got a master degree.

[2] I was employed as an assistant professor (new system of position track) in 2020, which is equivalent to associate professor in the old track. In 2022, it seems that the new track changes the position's title.

[3] Unluckily, I did not go to CIRM due to personal reasons while my collaborators were there.

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. Meromorphic Parahoric Higgs Torsors and Filtered Stokes G-Local Systems on Curves,
   (with P. Huang) *Adv. Math.* 429, Paper No. 109183, 38 pp (2023).

9. On the image of Hitchin morphism for algebraic surfaces: The case GL_n,
   (with L. Song) *Int. Math. Res. Not.* IMRN 2024, no. 1, 492–514 (2024).

10. Logahoric Higgs Torsors for a Complex Reductive Group,
    (with G. Kydonakis and L. Zhao) *Math. Ann.* 388, no. 3, 3183–3228 (2024).

11. Poisson Structures on Moduli Spaces of Higgs Bundles over Stacky Curves,
    (with G. Kydonakis and L. Zhao) *Adv. Geom.*, vol. 24, no. 2, 163-182 (2024).

12. Tame Parahoric Nonabelian Hodge Correspondence in Positive Characteristic over Algebraic Curves,
    (with M. Li) *Selecta Math.* 30, no. 4, Paper No. 60, 36 pp (2024).

13. Moduli Space of Λ-modules on Projective Deligne-Mumford Stacks,
    arXiv: 2003.11674 (2020).

14. Tame Parahoric Nonabelian Hodge Correspondence on Curves,
    (with P. Huang, G. Kydonakis and L. Zhao) arXiv: 2205.15475 (2022).

15. Moduli Spaces of Filtered G-local Systems on Curves,
    (with P. Huang) arXiv: 2304.09999 (2023).

16. On the Gr-semistable Filtration of Orthogonal/Symplectic λ-connections,
    (with M. Sheng and J. Wang) arXiv:2401.09956 (2024).

17. Filtered Stokes G-local Systems in Nonabelian Hodge Theory on Curves,
    (with P. Huang) arXiv: 2404.13553 (2024).

18. A Nonabelian Hodge Correspondence for Principal Bundles in Positive Characteristic,
    (with M. Sheng and J. Wang) arXiv: 2405.09947.