Yufei Shan

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my website

Academic Interests

My research interests: geometric analysis, conformal geometry, CR-geometry, symmetric spaces, microlocal analysis, semiclassical microlocal analysis, representations of Lie groups and Lie algebras, etc.

At present, my research focuses on the stability of the asymptotically hyperbolic Einstein manifolds on the Ricci flow under the advice of Jie Qing

Education

University of California, Santa Cruz

- Ph.D. in Mathematics (expected August 2022).
- Dissertation: Asymptotically Symmetric metrics and Ricci Flows
- Advisor: Jie Qing.

University of Science and Technology of China

- M.Sc. in Mathematics (09/2015 - 06/2017).
- Thesis: The upper bound for the eigenvalue of the Laplace-Beltrami operator on $\mathbf{S}^2$
- Advisor: Zuoqin Wang

Sichuan University

- B.S. in Mathematics and Applied Mathematics (09/2011 - 06/2015)

Research Experiences

2. **The Heat Kernel Estimate on the Asymptotically Hyperbolic Manifolds and the Stability of the Asymptotically Hyperbolic Einstein Manifolds on the Ricci flow** (joint with Jie Qing). Status (in prep). More details

   - Studied the relations between the heat kernel of Lichnerowicz Laplacian and the long time existence and the convergence of the Ricci flow based on the result of R.Bamler.
   - Studied the relations between the heat kernel and resolvent of Lichnerowicz Laplacian (This is a direct corollary of the spectrum theorem) and tried to get the estimate of the heat kernel of Lichnerowicz Laplacian by the corresponding Schwartz kernel of that. By the work of X.Chen and A.Hassell, in order to get a good estimate of the heat kernel of Lichnerowicz Laplacian, we need a tensor version result of R.B.Melrose, A.S.Barreto and A.Vasy.
   - Trying to generalized the result of R.B.Melrose, A.S.Barreto, A.Vasy about the Schwartz kernel estimate from the Laplacian operator on the function to the Lichnerowicz Laplacian on the symmetric two tensor.

[1] Updated May 22, 2022

1. **The Perturbation Existence and the Stability of Conformally Compact Einstein Manifolds under the Ricci flow** (joint with Jie Qing). Status (in prep). A draft of my paper about these results
    - Recovered J. Lee's result (See the Theorem A) about the perturbation Existence of the conformally compact Einstein manifolds by the Ricci flow
    - Improved the result of J.Qing, Y.Shi and J.Wu (See Theorem 1.3) about the stability of conformally compact Einstein manifolds.

Invited Talks

2. *05/13/2021*. Mathematical Colloquium, UC Santa Cruz, The Heat Kernel Estimate on the Asymptotically Hyperbolic Manifold and the Stability of the Asymptotically Hyperbolic Einstein Manifold, The link for slices.

1. *08/08/2019*. Geometric Analysis and Mathematical General Relativity Seminar, Peking University, Asymptotically Symmetric Space and the Ricci Flow, The link for slices.

Teaching Experience

University of California, Santa Cruz

- **Instructor:**
    - **Math121A** Differential Geometry (2019 Spring)
- **Teaching Assistant:**
    - **Math19A** Calculus for Science, Engineering, and Mathematics (2017 Fall, 2018 Summer, 2019 Fall, 2021 Spring)
    - **Math19B** Calculus for Science, Engineering, and Mathematics (2018 Winter, 2020 Winter, 2021 Winter)
    - **Math23A** Calculus for Science, Engineering, and Mathematics (2018 Spring, 2020 Spring, 2020 summer, 2021 Fall)
    - **Math23B** Calculus for Science, Engineering, and Mathematics (2020 Fall, 2022 Spring)
    - **Math21** Linear algebra (2018 Fall)
    - **Math106** Ordinary Differential Equation (2019 Winter)
    - **Math100** Introduction to Proof and Problem Solving (2019 summer)
    - **Math115** Graph Theory (2020 Summer)
    - **Math145** Introductory Chaos Theory (2022 Winter)

Awards

- 09/2016: The first-class Graduate Student Scholarship of University of Science and Technology of China
- 11/2014: The Second-class Single Scholarship of Sichuan University
- 11/2013: The First Prize of the 5th Chinese Mathematics Competitions (CMC) (Sichuan Division) .