

Wei-Xi LI

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Education

2003 BA degree in Mathematics, Wuhan University

2008 PhD, Wuhan University, Thesis adviser: Hua Chen

Positions

Professor	Wuhan University, November 2014-Present
Associate Professor	Wuhan University, November 2012 - October 2014
Lecturer	Wuhan University, July 2008 - October 2012
Postdoctor	University of Bologna, February 2012 - January 2013 Mentor: Alberto Parmeggiani
Postdoctor	Nantes University, January - December, 2011 Mentor: Frédéric Hérau and Xue Ping Wang
Postdoctor	Lund University, January - December, 2010 Mentor: Nils Dencker
Postdoctor	Université Paris VI, February -December, 2009 Mentor: Nicolas Lerner

Research Interests

- Spectral analysis (Compact resolvent, Fokker-Planck operator, Witten Laplacian)
- Boundary layer analysis for fluid mechanics equations (Prandtl equation, inviscid limit of Navier-Stokes equation, ...)
- Regularity of degenerate elliptic equations (Boltzmann equation, Monge-Ampère equations, twisted Laplacians, ...)

Research Fundings

- NSFC (Distinguished Young Scholars Program), No.12325108, 01/2024 - 12/2028
- Joint Research Program of NSFC and RGC (Hong Kong PI: Renjun Duan), Project No. 11961160716, 01/2020 - 12/2023
- NSFC (General Program), No.11871054, 01/2019 - 12/2022
- Fok Ying Tung Education Foundation, No.151001, 03/2016 - 03/2019
- NSFC (Excellent Young Scholars Program), No.11422106, 01/2015 - 12/2017
- NSFC (Young Scholars Program), No.11001207, 01/2011 - 12/2013
- NSFC (Tianyuan Mathematics), No.10926119, 01/2010 - 12/2010
- Scientific Research Foundation for the ROCS, 01/2014 - 12/2015
- Postdoc Fellowship of France, Sweden and Italy

Editorial Activity

2021-Present Discrete and Continuous Dynamical Systems - Series B
2022-Present Communications in Mathematical Analysis and Applications
2025-Present Kinetic and Related Models

Student Supervision

- Lv-Qiao Liu, MS 06/2017, PhD 06/2020, Associate Professor at Anhui Normal University
- Hao Wang, PhD 06/2020, Assistant Professor at Hubei University
- Rui Xu, PhD 06/2022, Lecturer at Hubei University of Medicine
- Juan Zeng, MS 06/2020, PhD 06/2023. Lecturer at Yunan Minzu University
- Junling Chen, MS 06/2021, PhD 06/2024. Postdoc at Chinese University of Hong Kong
- Jiayi Wang, PhD student since 09/2024
- Qi An, MS 06/2022, PhD student since 09/2022
- Zhan Xu, PhD student since 09/2023
- Wenlong Liu, MS student since 09/2023
- Dingding Yu, MS 06/2022
- Mengting Yan, MS 06/2020
- Shan Wang, MS 06/2020 (Bézout Master's program)
- Jin Tan, MS 06/2020 (suspended for Bézout Master's program)

- Yan-Lin Wang, MS 06/2017
- Jin-Nan Guo, MS 06/2017
- Wei-Man Xu, MS 06/2017

Publication

- [45] Ling-Bing He, Jie Ji and Wei-Xi Li. On the Boltzmann equation with soft potentials: Existence, uniqueness and smoothing effect of mild solutions. Preprint. arXiv:2410.13205
- [44] Wei-Xi Li, Zhan Xu and Anita Yang. Global well-posedness of the MHD boundary layer equations in the Sobolev Space. *Sci. China Math.* (Accepted). arXiv:2409.11009
- [43] Wei-Xi Li, Tianyuan Yu and Xiaojing Xu. On the hydrostatic approximation of the 3D Boussinesq equations of damped wave type. *SIAM J. Math. Anal.* 57 (2025), no. 3, 2952-2982.
- [42] Ke Chen, Wei-Xi Li and Tong Yang. Local Well-Posedness of the Three Dimensional Linearized MHD Boundary Layer System. *Commun. Math. Anal. Appl.* 3(2024), No. 4, 483-500.
- [41] Jun-Ling Chen, Wei-Xi Li and Chao-Jiang Xu, Sharp regularization effect for the non-cutoff Boltzmann equation with hard potentials. *Ann. Inst. H. Poincaré C Anal. Non Linéaire* 42 (2025), no. 4, 933-970.
- [40] Wei-Xi Li, Tong Yang and Ping Zhang. Gevrey Well-Posedness of Quasi-Linear Hyperbolic Prandtl Equations. *Commun. Math. Anal. Appl.* 2 (2023), no. 4, 388-420
- [39] Wei-Xi Li, Marius Paicu and Ping Zhang. Gevrey solutions of quasi-linear hyperbolic hydrostatic Navier-Stokes system. *SIAM Journal on Mathematical Analysis* 55 (2023), no. 6, 6194-6228
- [38] Hongmei Cao, Wei-Xi Li and Chao-Jiang Xu, Analytic smoothing effect of the spatially inhomogeneous Landau equations for hard potentials. *J. Math. Pures Appl.* 176 (2023), 138–182.
- [37] Wei-Xi Li, Rui Xu and Tong Yang, Global Well-posedness of a Prandtl Model from MHD in Gevrey Function Space. *Acta Mathematica Scientia*, 42(2022), 2343-2366. Dedicated to Professor Banghe LI on the occasion of his 80th birthday.
- [36] Wei-Xi Li and Tong Yang, 3D hyperbolic Navier-Stokes equations in a thin strip: global well-posedness and hydrostatic limit in Gevrey space. *Communications in Mathematical Analysis and Applications*, 1(2022), 471-502.
- [35] Wei-Xi Li and Rui Xu, Gevrey well-posedness of the hyperbolic Prandtl equations. *Communications in Mathematical Research*, 38(2022), 605-624. In honor of Professor Chao-Jiang Xu on the occasion of his 65th birthday

- [34] Wei-Xi Li, Nader Masmoudi and Tong Yang. Well-posedness in Gevrey function space for 3D Prandtl equations without Structural Assumption. *Communications on Pure and Applied Mathematics* 75(2022), 1755-1797.
- [33] Renjun Duan, Wei-Xi Li and Lvqiao Liu, Gevrey regularity of a mild solution to the non-cutoff Boltzmann equation. *Advances in Mathematics* 395 (2022), Paper No. 108159, 75pp.
- [32] Hua Chen, Xin Hu, Wei-Xi Li and Jinpeng Zhan, The Gevrey smoothing effect for the spatially inhomogeneous Boltzmann equations without cut-off. *Science China Mathematics* 65 (2022), no. 3, 443-470
- [31] Wei-Xi Li and Rui Xu. Well-posedness in Sobolev spaces of the two-dimensional MHD Boundary layer equations without viscosity. *Electronic Research Archive* 29 (2021), no. 6, 4243-4255
- [30] Wei-Xi Li and Chao-Jiang Xu. Subellipticity of some complex vector fields related to Witten Laplacian. *Communications on Pure and Applied Analysis* 20 (2021), no. 7-8, 2709-2724. Special issue in Honor of the 80th birthday of Professor Shuxing Chen.
- [29] Wei-Xi Li and Tong Yang, Well-posedness of the MHD boundary layer system in Gevrey function space without Structural Assumption. *SIAM Journal on Mathematical Analysis* 53 (2021), No.3, 3236-3264
- [28] Wei-Xi Li and Juan Zeng, Weighted and maximally hypoelliptic estimates for the Fokker-Planck Operator with electromagnetic fields. *Communications in Mathematical Research* 37 (2021), pp. 255-270.
- [27] Wei-Xi Li and Lvqiao Liu, Gelfand-Shilov smoothing effect for the spatially inhomogeneous Boltzmann equations without cut-off. *Kinetic and Related Models*, 13(2020), no. 5, 1029-1046
- [26] Hua Chen, Xin Hu, Wei-Xi Li and Jinpeng Zhan, The resolvent of the linearized Boltzmann operator with a stationary potential. *Journal of Pseudo-Differential Operators and Applications* 11 (2020), no. 2, 733-751
- [25] Wei-Xi Li and Tong Yang, Well-posedness in Gevrey function space for the Prandtl equations with non-degenerate critical points. *Journal of the European Mathematical Society (JEMS)* 22(2020), 717-775
- [24] Radjesvarane Alexandre, Frédéric Hérau and Wei-Xi Li, Global hypoelliptic and symbolic estimates for the linearized Boltzmann operator without angular cutoff. *Journal de Mathématiques Pures et Appliquées* 126 (2019) 1-71
- [23] Wei-Xi Li, Van-Sang Ngo and Chao-Jiang Xu, Boundary layer analysis for the fast horizontal rotating fluids. *Communications in Mathematical Sciences* 17(2019), 299-338
- [22] Wei-Xi Li, Spectral Analysis for Fokker-Planck operator and Witten Laplacian(in Chinese), in Honor of the 90th birthday of Professor Minyou Qi. *SCIENTIA SINICA Mathematica* 49(2019),161-174

- [21] Wei-Xi Li, Alberto Parmeggiani and Yan-Lin Wang, Global Gevrey hypoellipticity for twisted Laplacian on forms. *Journal of Pseudo-Differential Operators and Applications* 9(2018), 151-171.
- [20] Wei-Xi Li, Compactness of the resolvent for the Witten Laplacians. *Annales Henri Poincaré* 19 (2018), 1259-1282
- [19] Wei-Xi Li, Compactness criteria for the resolvent of Fokker-Planck operator. *Annali della Scuola Normale Superiore di Pisa, Classe di Scienze*, Vol. XVIII (2018), 119-143
- [18] Feng Cheng, Wei-Xi Li and Chao-Jiang Xu, Vanishing viscosity of Navier-Stokes flow to ideal flow in Gevrey space. *Mathematical Methods in the Applied Sciences* 40 (2017), 5161-5176
- [17] Feng Cheng, Wei-Xi Li and Chao-Jiang Xu, Gevrey regularity with weight for incompressible Euler equation in the half space. *Acta Mathematica Scientia* 37 (2017), no. 4, 1115-1132
- [16] Wei-Xi Li, Di Wu and Chao-Jiang Xu, Gevrey Class Smoothing Effect for the Prandtl Equation. *SIAM J. Math. Anal.* 48 (2016), 1672–1726
- [15] Wei-Xi Li, Peng Luo and Shuying Tian, L^2 -regularity of kinetic equations with external potential. *Journal of Differential Equations*, 260 (2016) 5894-5911
- [14] Wei-Xi Li, Global hypoelliptic estimates for fractional order kinetic equation. *Mathematische Nachrichten* 287(2014), 610–637
- [13] Hua Chen, Wei-Xi Li and Ling-Jun Wang, Regularity of traveling free surface water waves with vorticity. *Journal of Nonlinear Sciences* 23(2013), 1111-1142
- [12] Wei-Xi Li and Alberto Parmeggiani, Global Gevrey-hypoellipticity for twisted Laplacians. *Journal of Pseudo-Differential Operators and Applications* 4(2013), 279-296
- [11] Frédéric Hérau and Wei-Xi Li, Global hypoelliptic estimates for Landau-type operator with external potential. *Kyoto Journal of Mathematics* 53 (2013), 533-565
- [10] Renjun Duan and Wei-Xi Li, Hypocoercivity for the linear Boltzmann equation with confining forces. *Journal of Statistical Physics* 148(2012), 306–324
- [9] Wei-Xi Li, Global hypoellipticity and compactness of resolvent for Fokker-Planck operator, *Annali della Scuola Normale Superiore di Pisa, Classe di Scienze* (5) Vol. XI(2012), 789-815
- [8] Hua Chen, Wei-Xi Li and Chao-Jiang Xu, Gevrey regularity of subelliptic Monge-Ampère equations in the plane, *Advances in Mathematics* 228(2011) 1816-1841
- [7] Hua Chen, Wei-Xi Li and Chao-Jiang Xu, Gevrey hypoellipticity for a class of kinetic equations, *Comm. Partial Differential Equations* 36 (2011) 693-728.

- [6] Hua Chen, Wei-Xi Li and Chao-Jiang Xu, Analytic smoothness effect of solutions for spatially homogeneous Landau equation, *Journal of Differential Equations* 248 (2010) 77-94.
- [5] Hua Chen, Wei-Xi Li and Chao-Jiang Xu, Gevrey hypoellipticity for linear and non-linear Fokker-Planck equations, *Journal of Differential Equations* 246 (2009), 320- 339
- [4] Hua Chen, Wei-Xi Li and Chao-Jiang Xu, Gevrey regularity for solution of the spatially homogeneous Landau equation, *Acta Mathematica Scientia* 29(2009), 673-686
- [3] Hua Chen, Wei-Xi Li and Chao-Jiang Xu, Propagation of Gevrey regularity for solutions of Landau equations, *Kinetic and Related Models* 1(2008), 355- 368.
- [2] Shaohua Wu, Hua Chen and Wei-Xi Li, The local and global existence of the solutions of hyperbolicparabolic system modeling biological phenomena, *Acta Mathematica Scientia* 28 (2008), 101- 116.
- [1] Wei-Xi Li and Tong Yang , Well-posedness in Gevrey function space for the three-dimensional Prandtl equations. Unpublished, arXiv:1708.08217