查帅 Shuai Zha– *Curriculum Vitae*

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Research interests

Supernovae, gravitational waves, stellar evolution

Positions

07/2023 - present	Researcher, Yunnan Observatories, Chinese Academy of Sciences
06/2021 - 07/2023	Postdoctoral researcher, Tsung-Dao Lee Institute, Shanghai Jiaotong University
09/2019 - 06/2021	Postdoctoral researcher, Department of Astronomy, Stockholm University

Education

08/2015 - 08/2019	Ph.D. - Physics Department, the Chinese University of Hong Kong *Research field: Supernova simulation and stellar evolution*
09/2012 - 07/2015	Master - Physics Department, Fudan University *Research field: Femtosecond laser spectroscopy and nonlinear optics*
09/2008 - 07/2012	B.Sc. - Physics Department, Fudan University

Publications

25 in total (**2** under review), **10** first author, **15** coauthor (mostly second author)
* denotes paper as corresponding author

3 *Physical Review Letters*, *h*-index: 12, total citation: 906 (Google scholar)

Under review:

1. Strong magnetic field inside degenerate relativistic plasma and its impacts on the neutrino transport in Core-Collapse Supernovae
   Yudong Luo, **Shuai Zha**, Toshitaka Kajino
   Submitted to *Astrophysical Journal*;

First author:

1. The proper way to spatially decompose the gravitational-wave origin in stellar collapse simulations
   Shuai Zha
   Accepted by *Physical Review D* ; arXiv:2405.09729

2. Nucleosynthesis in the Innermost Ejecta of Magnetorotational Supernova Explosions in 3-dimensions
Shuai Zha, Bernhard Müller, Jade Powell
Accepted by *Astrophysical Journal* ; arXiv:2403.02072

3. Unveiling the Nature of Gravitational-Wave Emission in Core-collapse Supernovae with Perturbative Analysis
Shuai Zha, Oliver Eggenberger Andersen, Evan O'Connor
Physical Review D 109, 083023 (2024); arXiv:2403.02067

4. Light Curves of Type IIP Supernovae from Neutrino-driven Explosions of Red Supergiants Obtained by a Semi-analytic Approach
Shuai Zha, Bernhard Müller, Amy Weir, Alexander Heger
Astrophysical Journal **952**, 155 (2023); arXiv:2301.00359

5. Impact of Rotation on the Multimessenger Signatures of a Hadron-quark Phase Transition in Core-collapse Supernovae
Shuai Zha, Evan P. O'Connor
Physical Review D **106**, 123037 (2022); arXiv:2209.12418

6. Hydrodynamic Simulations of Electron-capture Supernovae: Progenitor and Dimension Dependence
Shuai Zha, Evan P. O'Connor, Sean Couch, Shing-Chi Leung, Ken'ichi Nomoto
MNRAS **513**, 1317 (2022); arXiv:2112.15257

7. Progenitor Dependence of Hadron-quark Phase Transition in Failing Core-collapse Supernovae
Shuai Zha, Evan P. O'Connor, André da Silva Schneider
Astrophysical Journal **911**, 74 (2021); arXiv:2103.02268

8. Gravitational-wave Signature of a First-order Quantum Chromodynamics Phase Transition in Core-Collapse Supernovae
Shuai Zha, Evan P. O'Connor, Ming-chung Chu, Lap-Ming Lin, Sean M. Couch
Physical Review Letters **125**, 051102 (2020); *Editor's Suggestions*; arXiv:2007.04716

9. Evolution of ONeMg Core in Super-AGB Stars toward Electron-Capture Supernovae: Effects of Updated Electron-Capture Rate
Shuai Zha, Shing-Chi Leung, Toshio Suzuki, Ken'ichi Nomoto
Astrophysical Journal **886**, 22 (2019); arXiv:1907.04184; IPMU *press.*

10. Accretion-Induced Collapse of Dark Matter Admixed White Dwarfs - II: Rotation and Gravitational-wave Signals
Shuai Zha, Shing-Chi Leung, Ming-Chung Chu, Lap-Ming Lin
Astrophysical Journal **883**, 13 (2019); arXiv:1908.05150

Coauthor:

11. SN 2022acko: a low-luminosity SNe IIP with signs of early circumstellar interaction
Han Lin, Jujia Zhang, Xiaofeng Wang, Maokai Hu, **Shuai Zha**, Danfeng Xiang, Liping Li, Andrea Reguitti, Yongzhi Cai, Xinghan Zhang, Zhenyu Wang, Zeyi Zhao, Qian Zhai, Fang Huang, Weili Lin, Jinming Bai
MNRAS, **540**, 2591 (2025);

12. Phase-transition-induced collapse of proto-compact stars and its implication for supernova explosions
Xu-Run Huang, **Shuai Zha***, Ming-chung Chu, Evan O'Connor, Lie-Wen Chen
Astrophysical Journal 979, 151 (2025); arXiv:2409.16189

13. He-accreting oxygen-neon white dwarfs and accretion-induced collapse events
Zhengyang Zhang, Chengyuan Wu, Amar Aryan, **Shuai Zha**, Dongdong Liu, and Bo Wang
Accepted by *Astrophysical Journal* ; arXiv:2409.16588

14. Light curves of the explosion of ONe WD+CO WD merger remnant and type Icn supernovae
Chengyuan Wu, **Shuai Zha**, Yongzhi Cai, Zhengyang Zhang, Yi Yang, Danfeng Xiang, Weili Lin, Xiaofeng Wang, Bo Wang
Astrophysical Journal Letters 967, L45 (2024); arXiv:2405.06885

15. Detectability of hadron-quark phase transition in neutrino signals of failing core-collapse supernova
Zidu Lin, **Shuai Zha**, Evan P. O'Connor, Andrew W. Steiner
Physical Review D **109**, 023005 (2024); arXiv:2203.05141

16. Gravitational Waves from a Core g-Mode in Supernovae as Probes of the High-Density Equation of State
Pia Jakobus, Bernhard Müller, Alexander Heger, **Shuai Zha**, Jade Powell, Anton Motornenko, Jan Steinheimer, Horst Stoecker
Physical Review Letters **131**, 191201 (2023); arXiv:2301.06515

17. Supernova Preshock Neutronization Burst as a Probe of Non-Standard Neutrino Interactions
Xu-Run Huang, **Shuai Zha**, Lie-Wen Chen
Astrophysical Journal Letters **923**, L26 (2021); arXiv:2110.07249

18. Equation of State Dependence of Gravitational Waves in Core-Collapse Supernovae
Oliver Eggenberger Andersen, **Shuai Zha**, André da Silva Schneider, Aurore Betranhandy, Sean M. Couch, Evan P. O'Connor
Astrophysical Journal **923**, 201 (2021); arXiv:2106.09734

19. Electron capture rates in ^{20}Ne for a forbidden transition to the ground state of ^{20}F relevant to final evolution of high density O-Ne-Mg cores
Toshio Suzuki, **Shuai Zha**, Shing-Chi Leung, Ken'ichi Nomoto
Astrophysical Journal **881**, 64 (2019); arXiv:1905.10400

20. Accretion-Induced Collapse of Dark Matter Admixed White Dwarfs - I : Formation of Low-mass Neutron Stars
Shing-Chi Leung, **Shuai Zha**, Ming-Chung Chu, Lap-Ming Lin, Ken'ichi Nomoto
Astrophysical Journal **884**, 9 (2019); arXiv:1908.05102

21. Constraints on the chemical enrichment history of the Perseus Cluster of galaxies from high-resolution X-ray spectroscopy
Aurora Simionescu et. al. (36 authors including Shuai Zha)
Mon. Notices Royal Astron. Soc., **483**, 1701 (2018)

22. Surface pH and Ion Affinity at the Alcohol-Monolayer/Water Interface Studied by Sum- Frequency Spectroscopy
Yu-Chieh Wen, **Shuai Zha**, Chuanshan Tian, and Yuen-Ron Shen
The Journal of Physical Chemistry C, **120**, 28 (2016)

23. Unveiling Microscopic Structures of Charged Water Interfaces by Surface-Specific Vibrational Spectroscopy
Yu-Chieh Wen, **Shuai Zha**, Xing Liu, Shanshan Yang, Pan Guo, Guosheng Shi, Haiping Fang, Yuen-Ron Shen, and Chuanshan Tian
Physical Review Letters, **116**, 016101 (2016)

24. Carbon nanodots featuring efficient FRET for two-photon photodynamic cancer therapy with a low fs laser power density
Jing Wang, Zehui Zhang, **Shuai Zha**, Yinyan Zhu, Peiyi Wu, Benjamin Ehrenberg, and Ji-Yao Chen
Biomaterials, **35**, 9372 (2014)

Grants and Selected Awards

03/2025	Yunnan Fundamental Research – Key Program, 500k RMB
01/2025	NSFC general program, 530k RMB
01/2025	CAS Talent-Introduction Program
01/2024	NSFC major program, 500/5,400k RMB
05/2024	ACAMAR visiting fellowship, 15k AUD
07/2022	China Postdoctoral Science Foundation General Program, 80k RMB
11/2021	Chinese International Postdoctoral Exchange Fellowship Program (Talent-Introduction Program), 400k RMB
06/2020	IAU travel grant for IAU Symposium 362, 400 Euro
12/2019	Grant for collaboration with University of Tokyo, 50k SEK
09/2017	Global Scholarship Programme for Research Excellence, CUHK, 20k HKD
09/2008	Scholarship for outstanding fresh undergraduate student, Fudan University

Computer times

08/2022 - 08/2023	CoI, Swedish National Infrastructure for Computing, 4.2 million core-h
08/2021 - 08/2022	CoI, Swedish National Infrastructure for Computing, 1.8 million core-h
08/2020 - 08/2021	CoI, Swedish National Infrastructure for Computing, 1 million core-h

Professional Activities

08/2024	Organizer of YNAO-SWIFAR Joint Workshop on Stellar Astrophysics and Time-domain Astronomy, Kunming, China
07/2024-	Referee for *Astronomy & Astrophysics*
04/2024-	Referee for *Physical Review D*
03/2024-	Referee for *The Open Journal of Astrophysics*
12/2023	Mini-symposium convener of the 32nd Texas Symposium on Relativistic Astrophysics, Shanghai, China
09/2021-	Referee for *the Astrophysical Journal*
02/2019	Organizer of Supernova Mini-Workshop in CUHK, Hong Kong, China

Research activities

08/2020 - 09/2020	Visiting scholar, TDLee Institute, Shanghai Jiaotong University, Shanghai, China Collaboration with Prof. Lie-Wen Chen on the impact of neutrino non-standard interaction on supernova
09/2017 - 01/2018	Kavli IPMU, the University of Tokyo, Tokyo, Japan Collaboration with Prof. Ken'ichi Nomoto on Evolution of Super-AGB stars towards Electron-Capture Supernova

Seminar talks

Apr. 2024 Beihang University, Beijing, China

Apr. 2024 Tsinghua University, Beijing, China

Apr. 2024 Nanjing University, Nanjing, China

Nov. 2023 Kavli IPMU, APEC seminar, Tokyo, Japan

Apr. 2023 Yunnan Observatories, Kunming, Yunnan, China

Nov. 2021 Central Normal University, Wuhan, China

Nov. 2021 Huazhong University of Science and Technology, Wuhan, China

Nov. 2020 TDLee Institute, Shanghai, China

Sep. 2020 Yunnan Observatories, Kunming, Yunnan, China

Sep. 2020 TDLee Institute, Shanghai, China

Aug. 2020 CTPU, IBS, South Korea, *via web*

Feb. 2020 OKC, EO meeting, Stockholm, Sweden

Jan. 2020 CUHK Seminar, Hong Kong, China

Oct. 2018 ASIAA, Lunch talk, Taipei, Taiwan, China

Jul. 2018 Kavli IPMU, APEC seminar, Tokyo, Japan

Jul. 2016 Kavli IPMU, APEC seminar, Tokyo, Japan

Conference presentations

Sep. 2024 Invited Lecture, INAC internal school on nuclear astrophysics, Beijing, China

Jun. 2024 Oral, 3rd workshop on Frontiers of Supernovae and Time-domain Astronomy, Beijing, China

Apr. 2024 Oral, 4th JUNO and Supernova Neutrinos, Beijing, China

Apr. 2024 Oral, Dense Matter EoS and Frontiers in Neutron Star Physics, Shanghai, China

Jun. 2023 Oral, Binary Stars, Haikou, China

Apr. 2023 Oral, 2nd JUNO and Supernova Neutrinos, Beijing, China

Nov. 2022 Oral, Supernova 2022 Melbourne, Australia, remote

Apr. 2021 Oral, APS April meeting 2021, remote

Nov. 2020 Oral, Partikeldagarna 2020, Sweden

Feb. 2020 Poster, Compact Objects for All, Lund, Sweden

Nov. 2019 Oral, Oskar Klein Center day, Stockholm, Sweden

May 2019 Oral, Electron-Capture-Initiated Stellar Collapse, Lorentz Center, Leiden, The Netherlands

Feb. 2019 Oral, Supernova Mini-Workshop in CUHK, Hong Kong, China

Nov. 2018 Oral, CoCoNuT Meeting 2018, CEA Saclay, Paris, France

Oct. 2018 Oral, The 8th East Asian Numerical Astrophysics Meeting, NCKU, Tainan, Taiwan, China

Sep. 2018 Poster, Sixth Annual GMT Community Science Meeting, Honolulu, Hawaii, United States

Feb. 2017 Poster, Quarks and Compact Stars, YITP, Kyoto University, Kyoto, Japan

Jul. 2016 Oral, 10th JGX Astrophysics Meeting, Xiamen University, Xiamen, China

Teaching experiences

06/2018 **Mentor** Lectures for summer students on supernovae and hydrodynamical simulations

06/2017 **Mentor** Summer student Soumyadeep Das on supernova simulation

2015-2019 **Teaching assistant**, CUHK, General Physics, Astronomy, exercise class

2012 **Teaching assistant**, Fudan University, University Physics, exercise class

Programming Languages

Fortran, Python, matlab, LaTeX, C