Jiangming Yao

Curriculum vitae

Professor
School of Physics and Astronomy, Sun Yat-sen University
Xiangzhou District, Zhuhai, Guangdong, China
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orcid.org/0000-0001-9505-1852

Research Interest

- Quantum many-body approaches: ab initio calculations, in-medium similarity renormalization group, chiral effective field theory, nuclear density functional theory
- Modeling nuclear matrix elements for new physics: nuclear Schiff moments and CP violation, neutrinoless double beta decay and neutrino physics
- Application to nuclear structure, hypernuclei, nuclear matter and neutron stars

Professional experience

2021–Now **Professor**, *School of Physics and Astronomy, Sun Yat-sen University*
2018–2021 **Postdoctoral Research Associate**, *FRIB/NSCL, Michigan State University*
2015–2017 **Postdoctoral Research Associate**, *University of North Carolina at Chapel Hill*
2013–2015 **Assistant Professor**, *Tohoku University*, Japan
2011–2012 **Postdoc**, *Université Libre de Bruxelles*, Belgium
2009–2017 **Professor**, *Southwest University*, China

Education

2004–2009 **PhD in Nuclear and Particle Physics**, *Peking University*, China
Thesis: Covariant density functional theory for nuclear spectroscopy
Supervisor: Jie Meng

2006–2008 **Exchange PhD program**, *Technical University of Munich*, Germany
Supervisor: Peter Ring

2000–2004 **BSc**, *Nankai University*, China

Teaching and tutoring experience

2022-now **Advanced Quantum Mechanics, graduate course**, *Sun Yat-sen University, China*
2022-now **Atomic Physics, undergraduate course**, *Sun Yat-sen University, China*
2021-now **Nuclear Theory, graduate course**, *Sun Yat-sen University, China*
2021-now **Introduction to Nuclear and Particle Physics, undergraduate course**, *Sun Yat-sen University, China*
2005 **Teaching Assistant**, *Peking University, China*
2009–2011 **Modern physics for undergraduate students**, *Southwest University, China*

Nuclear Theory for graduate students, *Southwest University, China*

Master Students Mentored

Jian Xiang **2009-2012**, *Covariant density functional theory for nuclear shape evolution and octupole vibration*, Master Thesis of Southwest University, Chongqing

Yun Fu **2010-2013**, *Covariant density functional theory for Kr isotopes and relativistic projected shell model*, Master Thesis of Southwest University, Chongqing

Xianye Wu **2011-2014**, *Systematic study of low-lying states in light nuclei with multi-reference covariant density functional theory*, Master Thesis of Southwest University, Chongqing

Weixia Xue **2012-2015**, *Covariant density functional theory for Lambda impurity effect in nuclear spectroscopy*, Master Thesis of Southwest University, Chongqing

Enfu Zhou **2013-2016**, *Collective excitations of octupole deformed nuclei with multi-reference covariant density functional theory*, Master Thesis of Southwest University, Chongqing

Wei Lin **2021-2024**, *The study of low-lying states of odd-mass nuclei with nuclear chiral interaction*, Master Thesis of Sun Yat-sen University, Zhuhai

Xin Zhang **2021-2024**, *Application of Machine Learning and Eigenvector Continuation to Generator Coordinate Method for Nuclear Physics*, Master Thesis of Sun Yat-sen University, Zhuhai

PhD students Mentoring

Enfu Zhou **2022-2025**, *Multi-reference covariant density functional theory for nuclear Schiff moments*

Ruonan Chen **2023-2026**, *Symmetry-restored quasiparticle random-phase approximation for nuclear beta decay*

Chenrong Ding **2023-2027**, *Ab initio studies of nuclear matrix elements of neutrinoless double-beta decay in heavy candidate nuclei*

Postdocs Mentored

Chen-can Wang **2022-2024**, *Relativistic ab initio studies of nuclear matter and finite nuclei*

Prizes and awards

2023 **J. M. Yao (PI)**, *National Natural Science Foundation of China*, Ab initio description of medium-mass deformed nuclei with in-medium generator coordinate method, Grant No. 12375119
$70,000 for period 01/01/2024–12/30/2027

2022 **J. M. Yao (PI)**, *Guangdong Basic and Applied Basic Research Foundation*, First-Principles Calculation of Nuclear Matrix Elements for Neutrinoless Double Beta Decay in Atomic Nuclei, Grant No. 2023A1515010936
$15,000 for period 01/01/2023–12/30/2025

2021 **J. M. Yao (Co-PI)**, *National Natural Science Foundation of China*, Theoretical Study on Neutrinoless Double-Beta Decay, Grant No. 12141501
$300,000 for period 01/01/2022–12/30/2025

2015 **J. M. Yao (PI)**, *National Natural Science Foundation of China*, Multi-reference covariant energy density functional theory for odd-odd nuclei, Grant No. 11575148
$80,000 for period 01/01/2016–12/30/2019

2014 **J. M. Yao (Co-PI)**, *Grant-in-Aid for Scientific Research (C)*, Low-lying collective excitations of hypernuclei with microscopic particle-rotor model, Grant No. 26400263
4,550,000 JPY for period 04/01/2014 –03/31/2017

2013 **J. M. Yao (PI)**, *National Natural Science Foundation of China*, Covariant energy density functional theory for the hyperon impurity effect in atomic nuclei, Grant No. 111105111
$30,000 for period 01/01/2012 –12/30/2014

2009 **J. M. Yao (PI)**, *National Natural Science Foundation of China*, Covariant energy density functional theory for the low-lying states of exotic nuclei, Grant No. 10947013
$20,000 for period 01/01/2010–12/30/2012

2006-2008 **European Community project Asia-Europe Link in Nuclear Physics and Astrophysics**, CN/ASIA-LINK/008 (094-791)

2008 **Wu-Si scholarship for top students**, *Peking University*

2001 **First prize in the mathematics competition for university students**, *Tianjin municipality*

Professional service

Reviewer for **National Natural Science Foundation of China**

Academic Degree and Education Evaluation of Chinese Ministry of Education

Reviewer for Journals **Physical Review C, Progress of Theoretical and Experimental Physics, Chinese Physics C, European Physical Journal A, International Journal of Modern Physics E, Communication in Theoretical Physics, Frontiers of Physics, Central European Journal of Physics, Science in China: Physics, Mechanics and Astronomy, Science Bulletin, etc**

Reviewer editor for **Frontier in Physics (Nuclear Physics), Symmetry**

Organizers of conferences and workshops

Chair **The workshop on "Generator coordinate method in nuclear physics", Zhuhai, March 14-16**, 2024

Co-organizer **The 2nd Symposium on Nuclear Physics in Guangdong-Hong Kong-Macao Area, Guangzhou, June 17-20**, *link*, 2023

Co-organizer **The 2nd workshop on "Neutrinoless double-beta decay and related topics", Zhuhai, May 18-23**, *link*, 2023

Chair **The 1st Symposium on Nuclear Physics in Guangdong-Hong Kong-Macao Area, Zhuhai, July 2-6**, *link*, 2022

Chair **The 1st workshop on "Neutrinoless double-beta decay and related topics", Zhuhai, May 18-23**, *link*, 2021

References

Kouichi Hagino, *hagino.kouichi.5m@kyoto-u.ac.jp*

Heiko Hergert, *hergert@frib.msu.edu*

Jie Meng, *mengj@pku.edu.cn*

Jonathan Engel, *engelj@physics.unc.edu*

Peter Ring, *peter.ring@tum.de*

Publications (see publication list for details)

Summary **100+ peer reviewed research papers**

20+ conference proceedings

4 book chapters

H-index is 33 and total number of citations is 3,000+ , *Web of Science*

ResearcherID **https://publons.com/researcher/1544854/jiangming-yao/**

Inspirehep `http://inspirehep.net/search?ln=zh_CN&ln=zh_CN&p=find+au+j.+m.+yao&of=hcs&action_search=??&sf=&so=d&rm=&rg=25&sc=0`

ORCID **http://orcid.org/0000-0001-9505-1852**

Invited talks in conferences/workshops

2024/12/20 **Advances in modeling nuclear matrix elements for $0\nu\beta\beta$ decay**, *Workshop on Double Beta Decay and Related Underground Experiments, Dec.20-21, Tsung-Dao Lee Institute, Shanghai, China* , (Link)

2024/11/16 **Modeling nuclear matrix elements for advancing new physics research in the era of high precision**, *The 2024 Asian Nuclear Physics Association Symposium, Nov. 16, 2024, Huizhou, Guangdong, China* , (Link)

2024/10/19 **Modeling $0\nu\beta\beta$ decay based on nuclear forces and transition operators from chiral effective field theory**, *The 9th workshop on chiral effective field theory, Changsha, Hunan, China, Oct. 19* , (Link)

2024/10/14 **Advances in the modeling of nuclear matrix elements of neutrinoless double-beta decay based on non-relativistic chiral nuclear forces**, *The 14th symposium on relativistic density functional, Nanjing, Jiangsu, China, Oct.14*

2024/5/25 **Multi-Reference In-Medium Similarity Renormalization Group Method and its Applications: Nuclear Shell Structure and Low-Lying States**, *Workshop on 'Nuclear Shell Model and Frontiers of Nuclear Physics', China Institute of Atomic Energy, Institute of Nuclear Physics, Beijing, May 24-27*, (Link)

2024/5/22 **Low-lying spectroscopy of even-even nuclei via projected generator coordinate method calculations with a multi-reference in-medium similarity renormalization group pre-processing of the Hamiltonian**, *Workshop of the Espace de Structure et de réactions Nucléaires Théorique: Nuclear ab initio spectroscopy, CEA, Orme des Merisiers Campus, 91191 Gif-sur-Yvette, France, May 21-24*, (Link)

2024/5/18 **Nuclear Matrix Elements for $0\nu\beta\beta$ Decay: Progress and Prospects**, *The First Workshop on Neutrino Scattering: Theory, Experiment, Phenomenology (vSTEP 2024), Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences, Hangzhou, May 17-20*, (Link)

2024/4/27 **Advances in ab initio studies of deformed nuclei and neutrinoless double-beta decay with renormalization group methods**, *Long-term workshop on "Exploring nuclear physics across energy scales", Beijing, April15-28*, (Link)

2023/12/16 **Advances in Modeling neutrinoless double-beta decay with operators from chiral effective field theory**, *Annual meeting of NuDEx-CUPID-China, Huizhou, Dec. 15-17, 2023*

2023/12/21 **Modeling neutrinoless double-beta decay with operators from chiral effective field theory**, *The international workshop on the theoretical and experimental approaches for nuclear matrix elements of double-beta decay, Research Center for Nuclear Study, Osaka University, Osaka, Dec. 21-22*, (Link)

2023/11/18 **Multireference covariant density functional theory for low-lying states of odd-mass nuclei**, *Special workshop on 'Relativistic First-Principles Calculations of Atomic Nuclei'", China Institute of Atomic Energy, Institute of Nuclear Physics, Beijing, Nov. 17-19*, (Link)

2023/10/28 **Modeling neutrinoless double-beta decay with operators from chiral effective field theory**, *The 8th workshop on chiral effective field theory, Kaifeng, Henan, China, Oct. 27-31*

2023/5/18 **Ab initio calculations of nuclear matrix elements for neutrinoless double beta decay**, *The NνDEx Collaboration meeting, Institute of Modern Physics, Chinese Academy of Science, Lanzhou, Mar. 17-19, 2023*

2022/05/26 **Advances in modeling nuclear matrix elements of neutrinoless double beta decay**, *The Forum on High Energy Nuclear Physics in China, May 26, 2022*

2021/12/18 **Advances in modeling medium-mass hypernuclei**, *the 4th International Workshop on Strangeness Nuclear Physics (SNP), Dec 18-19, 2021*

2018/06/26 **Beyond relativistic mean-field approach to deformed hypernuclei**, *The 13th International Conference on Hypernuclear and Strange Particle Physics, June 24-29, 2018, Portsmouth Virginia, USA*

2014/09/12 **Nuclear matrix elements for neutrinoless double beta decay: multi-reference covariant DFT**, *The Autumn meeting of Chinese Physical Society (CPS2014), Sep. 11-14, 2014, Harbin, China*

2014/09/ **Multi-reference covariant density functional theory for nuclear spectroscopy: recent progress**, *The long-term workshop "Present Status of the Nuclear Interaction Theory", Aug 25-Sep 19, 2014, Kavli Institute for Theoretical Physics China (KITPC), Chinese Academy of Sciences, Beijing*

2011/10 **Impurity effect of Lambda hyperon on the collective excitation of atomic nuclei**, *The 18th Nuclear Physics Workshop "Nuclear Collective Phenomena ", September 28 - October 02, 2011, Kazimierz Dolny, Poland*

2011/09 **3D angular momentum restored calculations with a relativistic point-coupling Lagrangian**, *International workshop on "Restoring broken symmetries within the nuclear Energy Density Functional method", September 13-15, 2011, CEA/SPhN, Gif-sur-Yvette Cedex, Paris, France*

2009/09 **An extended covariant density functional theory for low-lying states of exotic nuclei**, *The 2009 Autumn meeting of Chinese Physical Society, September 17-20, 2009, Shanghai, China*

Contributed talks in conferences/workshops/schools/seminars

2023/12/29 **Advances in Modeling medium-mass Λ hypernuclei with mean-field-based approaches**, *Seminar, Xiamen University, Dec 29, 2023*

2023/12/18 **Advances in Modeling neutrinoless double-beta decay with operators from chiral effective field theory**, *Seminar, the Few-body Systems in Physics Laboratory, RIKEN, Dec 18, 2023*

2023/12/8 **neutrinoless double-beta decay and nuclear many-body problems with operators from chiral effective field theory**, *The 1st winter school on theoretical physics, Guangzhou, Dec 4-9, 2023*

2023/10/26 **Multi-reference covariant density functional theory for low-lying states of odd-mass nuclei** , *Seminar, East China Normal University, Shanghai, Oct. 26, 2023*

2023/10/25 **Modeling neutrinoless double-beta decay with operators from chiral effective field theory** , *Seminar, Tongji University, Shanghai, Oct. 25, 2023*

2023/10/24 **Theory of neutrinoless double-beta decay in atomic nuclei** , *Lectures, Tsung-Dao Lee Institute at Shanghai Jiao Tong University, Oct. 24, 2023*

2023/10/23 **Modeling neutrinoless double-beta decay with operators from chiral effective field theory** , *Seminar, Shanghai Jiao Tong University, Shanghai, China*

2023/6/28 **Nuclear matrix elements for neutrinoless double-beta decay**, *The 1st Jiangmen Summer School on Neutrinos, June 20-29, 2023, Kaiping, China*, link

2023/5/15 **Recent progress in ab initio modeling nuclear matrix elements for neutrinoless double beta decay** , *18th National Conference on Nuclear Physics, Huzhou, China*

2023/4/22 **Computing atomic nuclei starting from nuclear chiral forces: Introduction**, *The 12th Workshop on CDFT in Nuclear Physics, Tianjin, April 22, 2023*

2022/06/21 **ab initio studies of medium-mass nuclei and the matrix elements of neutrinoless double beta decay** , *Seminar, Institute of Modern Physics, Lanzhou, China*

2018/11/15 **Computing low-lying states of deformed nuclei with chiral NN+3N interactions**, *FRIB/NSCL, Michigan State University, East Lansing, USA*

2018/11/19 **Beyond mean-field approaches for nuclear physics**, *Physics Colloquium, Western Michigan University, Kalamazoo, USA*

2018/11/15 **Computing low-lying states of deformed nuclei with chiral NN+3N interactions**, *FRIB/NSCL, Michigan State University, East Lansing, USA*

2021/05/21 **Ab initio calculation of nuclear matrix elements for neutrinoless double beta decay**, *May 21, 2021 Workshop of neutrinoless double beta decay, Zhuhai, China*

2018/09/07 **GCM-based IMSRG and neutrinoless double beta decay**, *7-8 September, 2018 DBD Collaboration Meeting at Lawrence Berkeley National Laboraotory, USA*

2018/05/29 **Multi-reference in-medium similarity renormalization group for deformed nuclei**, *2018 NUCLEI Collaboration Meeting, May 29 to June 1, 2018, Knoxville, Tennessee, USA*

2018/04/03 **Generator Coordinate Method for Nuclear Low-Lying States: from MR-EDF to MR-IMSRG Calculations**, *Theory Seminar, NSCL/FRIB at MSU, East Lansing, USA*

2017/06/20 **Multi-Reference In-Medium SRG for Neutrinoless Double Beta Decay**, *INT Program 17-2a, Neutrinoless Double-beta Decay, University of Washington, Seattle, USA*

2017/06/08 **Multi-reference in medium SRG for neutrinoless double beta decay**, *NUCLEI Collaboration meeting, June 6-8, 2017 in Santa Fe, NM, USA*

2017/02/03 **Multi-Reference In-medium Similarity Renormalization Group for the Nuclear Matrix Elements of Neutrinoless Double Beta Decay**, *2017 DBD Collaboration Meeting, UMass Amherst, USA*

216/10/12 **Multi-reference covariant density functional theory for the nuclear matrix elements of Neutrinoless Double Beta Decay**, *Sichuan University, Chengdu, China*

2016/08/01 **Multi-reference In-medium SRG for the Nuclear Matrix Elements of Neutrinoless Double Beta Decay**, *2016 DBD Collaboration Meeting, August 1-2, 2016, FRIB, Michigan State University, East Lansing, USA.*

2015/06/ **Towards Ab-initio Calculation of Nuclear Matrix Elements for Neutrinoless Double Beta Decay**, *NUCLEI SciDAC Collaboration Meeting, June 6-10, at Argonne National Laboratory, USA*

2015/05/18 **Building New Nuclear Theory Research at York**, *University of York, UK*

2015/02/12 **Beyond relativistic mean-field study of low-lying states for quadrupole-octupole deformed nuclei**, *Collaboration workshop, Feb.12-13, 2015, Aizu University, Japan*

2014/09/18 **Unveiling nuclear structure with spectroscopic methods**, *School of Physics and Nuclear Energy Engineering, Beihang University, Beijing, China*

2014/03/17 **A relativistic energy density functional calculation of the nuclear matrix elements in neutrinoless double beta decay**, *International Molecule-type Workshop on New correlations in exotic nuclei and advances of theoretical models, Yukawa Institute for Theoretical Physics (YITP), Kyoto University, Japan, 2014*

2013/12/04 **Covariant density functional theory for nuclear collective excitations**, *Yukawa Institute for Theoretical Physics (YITP), Kyoto University, Japan*

2013/12/03 **Beyond mean-field description of impurity effect of Lambda hyperon on nuclear collective excitations**, *The Strangeness Nuclear Physics Laboratory, RIKEN Nishina center for Accelerator-Based Science, Japan*

2013/10/09 **Description of nuclear collective excitations with multi-reference covariant density functional theory: Role of dynamical correlation effects**, *The Theoretical Nuclear Physics Laboratory, RIKEN Nishina center for Accelerator-Based Science, Japan*

2013/09/10 **Multi-Reference Covariant Density Functional Theory for Nuclear Spectroscopy**, *Sendai Nuclear Science Colloquium, Tohoku University, Japan*

2012/01/17 **Beyond mean-field study of low-lying collective excitation states in lead region**, *Workshop on Coulex analysis in lead region, Jan. 16-17, 2012, K.U. Leuven, Belgium*

2011/06 **Effects of triaxiality in low-lying states of magnesium isotopes: a relativistic 3DAMP+GCM study**, *International Symposium: "Advances in Nuclear Many-Body Theory", Primosten, Croatia, June 7-10, 2011*

2010/09 **Configuration mixing of angular momentum projected triaxial relativistic mean-field states**, *The 17th Nuclear Physics Workshop, "Marie & Pierre Curie", "Symmetry and symmetry breaking in nuclear physics", 22-26th September 2010 in Kazimierz Dolny, Poland*

2010/06 **Beyond the relativistic mean-field theory: configuration mixing of three-dimensional angular momentum projected states**, *The BLTP/JINR - KLFTP/CAS Joint Workshop on NUCLEAR PHYSICS, Dubna, Russia, June 28-July 4, 2010*

2009/06 **Extending the covariant density functional theory for nuclear low-lying excited states – Three-dimensional angular momentum projected generator coordinate method**, *"Relativistic many-body problems for heavy and superheavy nuclei", Beijing, KITPC/ITP-CAS, June, 2009*