Zhicheng Xu

Employment Experience

July 2024 – Present: Postdoctoral Researcher, Fudan University, China

- Supervisor: Prof. Simin Wang

Education Experience

2015 – 2019: B.Sc. in Engineering, Nanjing University of Aeronautics and Astronautics

- Supervisor: Prof. Xiaotao He

2019– 2024: Ph.D. in Nuclear Physics, Peking University

- Supervisor: Prof. Furong Xu
- Thesis: Complex-Coordinate Ab initio Calculations of β Decay

Research

- **Research interests**

  Weakly-bound and unbound nuclei near the dripline are at the forefront of current research in nuclear physics. Several aspects of this research are particularly important and intriguing:

  1) **Structures and transitions of open quantum systems.** Dripline nuclei often exhibit exotic structures, such as halos and clusters, and decay modes, such as 2p/2n decay. These weakly-bound or unbound nuclei are known as open quantum systems, which can lead to phenomena like mirror symmetry breaking in both spectra and beta decay. Studying the structures and transitions of these nuclei can reveal the properties of fundamental nuclear forces.

  2) **Ab initio effective operator with continuum effect embedded.** Starting with the Chiral Effective Field Theory (EFT) realistic nuclear force, the effective Hamiltonian and effective operator with continuum effects embedded in the valence space can be obtained through ab initio many-body perturbation theory self-consistently. This method allows for the study of structures and transitions in dripline nuclei.

- **Researcher ID's**

  1) https://orcid.org/0000-0001-5418-2717

- **Computer Software Development**

  1) Ab initio many-body perturbation theory (MBPT) effective operator, Fortran based code for valence space effective operator calculation with continuum effect embedded.

Publication List

[1] **Z. C. Xu,** S. Zhang, J. G. Li, S. L. Jin, Q. Yuan, Z. H. Cheng, N. Michel, and F. R. Xu, "Complex valence-space effective operators for observables: The Gamow-Teller transition", **Physical Review C**, 108, L031301(2023).

[2] **Z. C. Xu**, R. Z. Hu, S. L. Jin, J. H. Hou, S. Zhang, and F. R. Xu, "Collectivity of nuclei near the exotic doubly magic 78Ni by ab initio calculations", accepted by **Physical Review C**, 110,024308.

Conferences

[1] Nuclear Theory in the Supercomputing Era 2024 (NTSE–2024), Busan, Republic of Korea, December 1 – 7, 2024

[2] The 10^{th} Information and Statistics in Nuclear Experiment and Theory (ISNET-2024), Shanghai, China, November 10 – 15, 2024

[3] The 4^{th} Nuclear physics School for Young Scientists (NUSYS-2024), Zhuhai, China, July 27 - August 3, 2024

[4] the 18^{th} China Nuclear Physics Conference, Huzhou, China, May 12 - 16, 2023