

#### Workshop on new generation nuclear density functionals 2025

The workshop on "New generation nuclear density functionals 2025" will take place at the **Fragrant Hill Hotel (Beijing, China)** from **June 26 to 30, 2025** and is organized by **China Institute of Atomic Energy (CIAE) and Peking University (PKU)**.

#### Website: https://indico.pku.edu.cn/event/40/

One of the most important scientific challenges in understanding the nature of processes producing most of the visible matter in the universe is the study of the formation, structure and dynamics of quantum systems at the femtometer scale. Theoretical nuclear physics has made significant progress in recent years with the aim of developing models that could provide a unified description of atomic nuclei throughout the chart of nuclides. Nuclear density functional theory presents the most complete and accurate description of ground-state properties and collective excitations over the whole nuclide chart. The workshop aims to discuss the ways toward the next generation nuclear density functionals by bridging the gap between the microscopic ab initio calculations and still largely phenomenological density functionals. Recent advances on nucleon-nucleon forces, the ab initio calculations for finite nuclei and neutron star matter, and nuclear density functional theories will be covered. The applications of new technologies, including machine learning and quantum computing, in nuclear physics will be involved. It will allow fruitful discussions on the cutting-edge research and future development of the ab initio density functional theory for finite nuclei. Another important goal will be to strengthen international collaboration on this and relevant subjects.

Key dates include registration on June 26, invited talks from June 27 to 29, and departure on June 30.

#### **Registration and Fee**

Please make registration through the Indico page "<u>Registration</u>", and submit the title of your presentation. A registration fee of 1000 CNY or 150 USD is required for participation. The details of the payment of the registration fee can be found on the Indico page "<u>Fee and Payment</u>".

#### Accommodation

We suggest participants stay at <u>Fragrant Hill Hotel</u> at our negotiated rate. We can assist with hotel bookings if needed. Accommodation and meals will be uniformly organized, with costs borne by participants.

#### Contact

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### **Workshop Guidelines**

- 1. On-site Registration
  - ♦ Time: 15:00-20:00, June 26, 2025
  - ♦ Place: 1<sup>st</sup> floor, Fragrant Hill Hotel
  - Registration desk: Collect the name tag and document bag (includes program, meal tickets, and pen), and sign on the registration form
  - ♦ Hotel front desk: Check in and receive your room card and breakfast tickets
- 2. Conference room:
  - ◆ Yixiang Hall (溢香厅), 2<sup>nd</sup> floor, Fragrant Hill Hotel
- 3. Accommodation

All participants are recommended to stay at the Fragrant Hotel.

- ♦ Standard room: 500 CNY per day (includes breakfast)
- $\diamond$  Breakfast: cafeteria on the 1<sup>st</sup> floor
- 4. Meals
  - ◆ Banquet: Yunxiang Hall (蕴香厅), 1st floor, the Fragrant Hill Hotel
  - ♦ Lunch & dinner: Huawufang Restaurant (花坞舫餐厅), 1<sup>st</sup> floor

Please use the meal tickets (excludes banquet)

 $\diamond$  Meal schedule:

Date	June 26	June 27	June 28	June 29
Lunch		11:30-13:30	11:30-13:30	11:30-13:30
Dinner	17:30-20:30	Banquet	17:30-20:30	17:30-20:30

Note: Please ensure that the meal tickets are used for yourself only and don't give them to non-participants. Please dispose of unused tickets or return them to the organizers. Thank you for your cooperation!

5. Parking

♦ Fee: 10 CNY per hour, up to 40 CNY per day

6. Tips

The Fragrant Hill Hotel is located within the Fragrant Hills Park. When entering the park, please inform the gatekeeper you are attending the workshop.

### Transportation

Taxi

Beijing Capital International Airport	42km	50min
Beijing Daxing International Airport	70km	1h10min
Beijing Railway Station	30km	50min
Beijingnan Railway Station	32km	45min
Beijingxi Railway Station	24km	35min

#### **Public transportation** (Subway)



After arriving at Fragrant Hills Station, you need to walk to the Fragrant Hill Hotel. It is about 17min (1.1km). The walking route is





### Nearby

#### Restaurants



### Program for

# Workshop on New Generation Density Functionals 2025

June 26 - 30, 2025 Fragrant Hill Hotel, Beijing

	June 26 <sup>th</sup> , 2025 (Thursday)
15:00-20:00	Registration (1 <sup>st</sup> Floor at the Fragrant Hill Hotel)
18:00-20:00	Dinner

<b>Conference</b> R	oom: Yixiang	Hall (溢香厅)
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	J	une 27 <sup>th</sup> , 2025 (Friday)		
8:00-8:30		Registration		
8:30-8:50		Opening and Photo		
Time	Speaker	Title	Chair	
8:50-9:30	<b>Shengjun Yuan</b> Wuhan University	Large-scale ab initio methods based on Wave Propagation	Dongwai Zhao	
9:30-10:10	<b>Bingnan Lu</b> Graduate School of China Academy of Engineering Physics	Recent progress in lattice effective field theory	Peking University	
10:10-10:30		Break		

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10:30-11:00	Xiulei Ren Shandong University	Nucleon-nucleon interaction in manifestly Lorentz-invariant ChEFT	
11:00-11:30	<b>Junxu Lu</b> Beihang University	An accurate relativistic chiral nuclear force	<b>Yingxun Zhang</b> China Institute of
11:30-12:00	Zhengxue Ren Forschungszentrum Jülich/Nankai University	Ab initio study of nuclear clustering in hot dilute nuclear matter	Atomic Energy
12:00-14:00		Lunch	
14:00-14:40	<b>Dario Vretenar</b> University of Zagreb	Microscopic models of induced fission dynamics	Jiangming Vao
14:40-15:10	<b>Jinniu Hu</b> Nankai University	The oscillations of neutron stars from covariant density functional theory	Sun Yat-sen University
15:10-15:30	<b>Bo Li</b> Peking University	Generalized time-dependent generator coordinate method for fission dynamics	
15:30-15:50		Break	
15:50-16:30	Piotr Magierski Warsaw University of Technology	Nuclear dynamics in the framework of time-dependent density functional theory with pairing correlations	
16:30-17:00	<b>Wenhui Long</b> Lanzhou University	Recent Progress and Applications of Relativistic Hartree-Fock theory	Shuangquan Zhang
17:00-17:30	<b>Jiangming Yao</b> Sun Yat-sen University	Multi-Reference Covariant Density Functional Theory for nuclear Schiff moment	Peking University
17:30-18:00	<b>Jian Li</b> Jilin University	Nuclear charge properties in relativistic density functional theory	
18:30-20:30		Banquet	

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June 28 <sup>th</sup> , 2025 (Saturday)				
Time	Speaker	Title	Chair	
8:30-9:10	Sergei Manzhos Institute of Science Tokyo	Combining the power of machine learning and portability and interpretability of analytic formulas when constructing kinetic energy functionals	Haozhao Liang	
9:10-9:40	<b>Xinhui Wu</b> Fuzhou University	Nuclear orbital-free energy density functionals from machine learning	The University of Tokyo	
9:40-10:00	<b>Qiang Zhao</b> China Institute of Atomic Energy	Exact-exchange relativistic density functional theory for atomic nuclei		
10:00-10:20		Break		
10:20-11:00	<b>Kenichi Yoshida</b> The University of Osaka	Skyrme energy-density functional approach to nuclear collective modes of excitation		
11:00-11:30	<b>Yingxun Zhang</b> China Institute of Atomic Energy	A transport model with Skyrme energy density functional - ImQMD model	<b>Jinniu Hu</b> Nankai University	
11:30-12:00	Yakun Wang Beihang University	Recent progress in relativistic configuration-interaction density functional theory		
12:00-13:00	00-13:00 Lunch			
13:00-14:00	Title: Neural net machine learning: Authors: Sergei M	Special Poster Session: work - Gaussian process regression hybrid from materials informatics to DFT functior anzhos(presenter), Yi Liu, Keisuke Kameda	for insightful nal development a, Manabu Ihara	
14:00-14:40	<b>Igor Izosimov</b> Joint Institute for Nuclear Research	Intermediate Structure in Nuclear Reactions and Beta-decays	<b>Jianmin Dong</b> Institute of	
14:40-15:10	Ruirui Xu China Institute of Atomic Energy	Nuclear Data Studies	Modern Physics, CAS	

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15:10-15:40	Yuan Tian China Institute of Atomic Energy	Applications of Covariant Density Functional Theory in Nuclear Data Research	
15:40-16:00	<b>Dandan Zhang</b> Institute of Theoretical Physics, CAS	Multinucleon transfer reaction with time- dependent covariant density functional theory	
16:00-16:20		Break	
16:20-17:00	Haozhao Liang The University of Tokyo	Studies in quartet BCS theory	
17:00-17:30	Youngman Kim Institute for Basic Science	Functional Renormalization Group Approach to Finite Nuclei	<b>Jie Yang</b> Liaoning Normal
17:30-17:50	<b>Yiping Wang</b> Peking University	Signature of proton-neutron pairing: Double binding energy difference along N = Z line	University
17:50-18:10	<b>Jing Geng</b> Lanzhou University	Time-dependent Relativistic Hartree-Fock Theory and Preliminary Application	
18:10-20:00		Dinner	

Workshop or	<b>New</b>	Generation	Nuclear	Density	<b>Functionals</b>	2025
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June 29 <sup>th</sup> , 2025 (Sunday)			
Time	Speaker Title		Chair
8:30-9:00	<b>Ligang Cao</b> Beijing Normal University	Constraining the symmetry energy via nuclear structure observables	
9:00-9:30	Panagiota Papakonstantinou Institute for Basic Science	Extending the nuclear energy density functional theory in a non-relativistic framework	<b>Wenhui Long</b> Lanzhou University
9:30-9:50	Sibo Wang Chongqing University	Relativistic Brueckner theory for nuclear matter and its application	
9:50-10:10		Break	
10:10-10:40	<b>Zhipan Li</b> Southwest University	Fourier shape parametrization in covariant density functional theory for nuclear fission	Xinle Shang
10:40-11:10	<b>Lang Liu</b> Jiangnan University	Phase Transitions of Pairing Correlation with the Shell-Model-Like Approach in Covariant Density Functional Theory	Institute of Modern Physics, CAS
11:10-11:40	<b>Ying Zhang</b> Tianjin University	$\Lambda\Lambda$ interaction in Multi- $\Lambda$ hypernuclei of O and Ca isotopes	
11:40-14:00		Lunch	
14:00-17:00		Discussions	
17:00-17:10	Closing		
17:30-20:00	Dinner		

	June 30 <sup>th</sup> , 2025 (Monday)
8:00-18:00	Departure

Note: All presentation times include 5 minutes for Q&A.