



中山大學 物理与天文学院
SUN YAT-SEN UNIVERSITY SCHOOL OF PHYSICS AND ASTRONOMY



Vortex states

in nuclear and particle physics

School of Physics and Astronomy, Sun Yat-sen University
April 24–28, 2024 • Zhuhai, Guangdong, China





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1924-2024
中山大學 世纪华诞
100th ANNIVERSARY
SUN YAT-SEN UNIVERSITY

School of Physics and Astronomy @ Sun Yat-sen University

80+ professors and associate professors

Research centers:

- **Tianqin project center**: future space-borne gravitational wave observatory to be launched in 2030-2035. Precision optics in space, lunar ranging facility.
- **Department of astronomy**: galactic cosmology, large-scale structure, stellar science, astronomical equipment development
- **Department of physics**
 - Theoretical physics Division
 - Quantum Engineering and Precision Measurement Division
 - Quantum Information and control Division



April 25, Thu

09:00	Welcome address	Prof. Igor Ivanov 09:00 - 09:10
	Electron Waves Carrying Orbital Angular Momentum: a historical overview of the early work	Prof. Franco Neri 09:10 - 09:50
10:00	Vortex beams at high-energy accelerators: generation strategies and measurement techniques	Prof. Dmitry Karlovets 09:50 - 10:30
	Coffee break	10:30 - 11:00
11:00	Vortex effects in QED scattering of high energy particles	Prof. Liangliang Ji 11:00 - 11:40
	Generation of Vortex Gamma Photons and Manipulation of Giant Multipole Resonances via nonlinear Compton scattering	Prof. Jianxing Li 11:40 - 12:20
12:00	Lunch	12:20 - 14:00
13:00	lunches at hotel	
14:00	Collision studies with vortex electrons and ions	Prof. Andrey Surzhykov 14:00 - 14:40
	Vortex electron scattering by atomic targets	Sophia Strmz 14:40 - 15:10
15:00	Twisting Wavefunctions of Relativistic Electrons via Intense Laser Pulses	Dr Zhigang Bu 15:10 - 15:40
	Coffee break	15:40 - 16:10
16:00	Discussion: vortex states prospects and challenges	16:10 - 17:10
17:00	discussion	

banquet

April 26, Fri

09:00	Atomic Spectroscopy with Twisted Photons	Prof. Andrei Afanasev 09:00 - 09:40
	Structured Quantum Waves: From Light to Matter Waves	Prof. Robert Fickler 09:40 - 10:20
10:00	Coffee break	10:20 - 10:50
11:00	A novel way to study nuclear giant resonances with vortex gamma photons	Prof. Yifei Niu 10:50 - 11:30
	Structured neutron waves	Prof. Dmitry Pushin 11:30 - 12:10
12:00	Lunch	12:10 - 14:00
13:00	Free afternoon	
14:00	Nuclear excitation by electron capture with electron vortex beams	Prof. Yuanbin Wu 14:00 - 14:40
	Nuclear photoabsorption in 229-Th using twisted light	Tobias Kirschbaum 14:40 - 15:10
15:00	Production of Neutron with Orbital Angular Momentum for Fundamental Physics Experiments	Niels Geerits 15:10 - 15:40
	Coffee break	15:40 - 16:10
16:00	Time-like proton form factors with vortex states	Dr Nikolai Korchagin 16:10 - 16:40
	Momentum space oscillation properties of vortex states collision	Pengcheng Zhao 16:40 - 17:10
17:00	The superkick effect in high-energy vortex state collisions	Bei Liu 17:10 - 17:40
	Detecting the Vortex state of high-energy electrons through elastic electron scattering	Zhengliang Li 17:40 - 18:10
18:00	banquet	

April 27, Sat

09:00	New results on vortex electron photoemission and scattering by atomic targets	Dr Alisa Cheikovskaya 09:00 - 09:30
	The motion of twisted particles in a stellar gravitational field	Dr Dandan Lian 09:30 - 10:00
10:00	Coffee break	10:00 - 10:30
	Dynamics and radiation of vortex electrons in magnetic fields	Georgii Szykh 10:30 - 11:00
11:00	Generating relativistic-intensity vortex laser by microstructure plasma target	Hao Zhang 11:00 - 11:30
	Generalized Gouy Rotation of Electron Vortex beam in a uniform magnetic field	Qi Meng 11:30 - 12:00
12:00	Closing remarks	Prof. Igor Ivanov 12:00 - 12:10

April 28, Sun

Full day
excursion to
JUNO