

The 1st International Workshop on Physics at High Baryon Density (PHD2024)

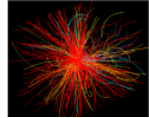


Physics at High Baryon Density (PHD2024)

<https://indico.ihep.ac.cn/event/22462/>

College of Physical Science and Technology
Central China Normal University, Wuhan

November 1 – 4, 2024



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Organizing Committee:

Heng-Tong Ding (Central China Normal University)

Weijie Fu (Dalian University of Technology)

Sophia Han (T. D. Lee institute, Shanghai Jiao Tong University)

Xiaofeng Luo (Central China Normal University, **co-Chair**)

Guoliang Ma (Fudan University)

Zebo Tang (University of Science and Technology of China)

Chi Yang (Shandong University)

Pengfei Zhuang (Tsinghua University, **co-Chair**)

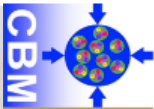
Yapeng Zhang (Institute of Modern Physics, CAS)

Venue:

- Workshop venue: Conference room at 1st floor of Guiyuan Hotel, CCNU
- Accommodation : Guiyuan Hotel
*152 Luoyu Road, Hongshan District
Wuhan 430079, Hubei, China*

“CBM day”

Friday, November 1



CBM Day

9:00 – 12:30, November 1, 2024

12:30 -13:30, Lunch Break;

Building 9, Conference Room 557, CCNU

Roundtable discussions on the status of the CBM experiment at FAIR and its physics programs

Participants:

Tetyana Galatyuk (TUD and GSI, Germany)

Shinichi Esumi, Toshihiro Nonaka (Tsukuba Univ., Japan)

Volker Friese (GSI, Germany)

Bedangadas Mohanty (NISER, India)

Joachim Stroth (GUF and GSI, Germany)

Jinhui Chen, Guoliang Ma (Fudan Univ.)

Chengdong Han, Xionghong He, Qiu Hao, Subhash Singha,

Yapeng Zhang (IMP)

Shengqin Feng (CTGU)

Guangming Huang, Feng Liu, Xiaofeng Luo, Shusu Shi, Yaping Wang, Xiaoming Zhang, Daicui Zhou, Zhongbao Yin (CCNU)

Yongjie Sun, Zebo Tang, Yifei Zhang (USTC)

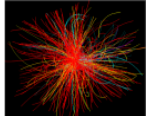
Yi Wang, Zhigang Xiao (THU)

Supported in part by CAS, CCNU, MOST and NSFC

12:30 – 13:30 Lunch Break (Guiyuan Hotel)

13:30 – 18:00 Free Discussion

Dinner : Guiyuan Hotel



Scientific Program

[Conference Room at 1st floor of Guiyuan Hotel]

Day 1 (Saturday, November 2)

Session 1. Opening and the Status of the Field

Chair: Enke Wang (South China Normal University)

08:20-08:40 **Welcome Speech & Photo**

08:40-09:10 Bedangadas Mohanty (NISER)
*“Fluctuations Measurements in
Nucleus-Nucleus Collisions”*

09:10-09:40 Jan Martin Pawłowski (Heidelberg Univ.)
*“Locating the Critical End Point and
the Phase Boundary of QCD from
First Principle QCD”*

09:40-10:10 Tetyana Galatyuk (TUD/GSI)
*“Exploring Baryon-Rich QCD Matter
with CBM at FAIR: Status and Prospects”*

10:10-10:40 **Coffee Break**

Session 2. Status of the Field (Experiments)

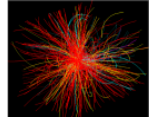
Chair: Nu Xu

10:40-11:05 Joachim Stroth (Frankfurt University)
“The HADES Experiment at GSI-SIS18”

11:05-11:30 Zebo Tang (USTC)
“Status of NICA/MPD Experiment”

11:30 -11:55 Yudai Ichikawa (Tohoku University)
*“Femtoscopic Study and Related Hadron
Physics in the J-PARC-HI Experiment”*

11:55-12:20 Zhigang Xiao (Tsinghua University)
*“The Opportunities of CEE in
the Studies of Nuclear EOS”*



12:20-13:30 **Lunch Break (Lunch Box)**

Session 3. Status of the Field (Theory)

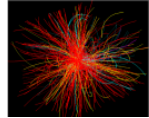
Chair: Sourendu Gupta (TIFR)

- 13:30-14:00 Pengfei Zhuang (Tsinghua University)
“Rotation Induced Color Confinement”
- 14:00-14:30 Yu-Xin Liu (Peking University)
“Searching for the CEP in the QCD Phase Diagram”
- 14:30-15:00 Fei Gao (Beijing Institute of Technology)
“QCD Phase Diagram in Functional Approaches”
- 15:00-15:30 Masakiyo Kitazawa (YITP, Kyoto Univ.)
“Evolution of Dense Matter and Experimental Signals in Heavy-Ion Collisions ”

Flash Talks (5 + 5min Q&A)

Chair: Hao Qiu (IMP, CAS)

- 15:30-15:40 Zhibin Zhu (Fudan University)
“Chiral Symmetry for an Accelerated and Rotated Observer”
- 15:40-15:50 Gaoqing Cao (Sun Yat-sen University)
“Extended Nambu-Jona-Lasinio Model for Quark and Nuclear Matters”
- 15:50-16:00 Yin Jiang (Beihang University)
“Gluon Matter Under Rotation”
- 16:00-16:10 Shujun Zhao (Peking University)
“Exploring the Nuclear Shape Transition in Ultra-Relativistic $^{129}\text{Xe}+^{129}\text{Xe}$ Collisions at LHC”
- 16:10-16:30 **Coffee Break**



Session 4. Baryon Productions and Correlations

Chair: Jinhui Chen (Fudan University)

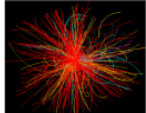
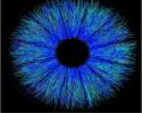
- 16:30-17:00 Yifei Zhang (USTC)
*“Light and Hyper-Nuclei
Production at RHIC”*
- 17.00-17:30 Lingxiao Wang (RIKEN)
*“Learning Hadron Interactions
with Neural Networks”*
- 17:30-17:55 Ke Mi (CCNU)
*“Baryon Correlations and Strange
Di-baryon Search at RHIC-STAR”*
- 17:55-18:20 Ye Yan (Nanjing Normal University)
*“Hadron-Hadron Interaction
and Exotic States”*
- 18:30-20:00 **Dinner (Xiao Guan Yuan)**

Day 2 (Sunday, November 3)

Session 5. Collective Excitations

Chair: Feng Liu (CCNU)

- 08:40-09:10 ShinIchi Esumi (University of Tsukuba)
*“Overview of Flow Measurements
at RHIC-BES”*
- 09:10-09:40 ChengDong Han (IMP, CAS)
*“Beam-Energy Dependence of the Light
and Hyper-Nuclei Directed Flow in
3.0-4.5 GeV Au+Au Collisions at RHIC”*
- 09:40-10:10 Li-Sheng Geng (Beihang University)
*“Unveil the Nature of Hadronic
Molecules Using Femtoscopy”*
- 10:10-10:40 **Coffee Break**



Session 6. Chiral Properties and Polarization

Chair: Bedangadas Mohanty (NISER)

10:40-11:10 Huanzhong Huang (UCLA)
*“Search for Chiral Magnetic Effect
with BES II Data from STAR”*

11:10-11:40 Subhash Singha (IMP, CAS)
*“Measurement of Global Spin
Polarization at RHIC”*

Flash Talks (5 + 5min Q&A)

Chair: Chi Yang (Shandong University)

11:40-11:50 Rui Wang (CCNU)
*“Topological Machine Learning
on Intermittency”*

11:50-12:00 Shanjin Wu (Lanzhou University)
*“Dynamics of the Conserved Net-baryon
Density Near QCD Critical Point Within
QGP Profile”*

12:00-12:10 Haolei Chen (Fudan University)
*“Critical Fluctuations and Correlations
of Quark Spin in Hot and Dense QCD
Matter”*

12:10-13:30 **Lunch Break (Guiyuan Hotel)**

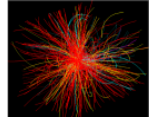
Session 7. Future Experiments and Detector

Chair: Qinghua Xu (Shandong University)

13:30-14:00 Yuxiang Zhao (IMP, CAS)
“China Hyperon Nuclear Spectrometer”

14:00-14:30 Xiangming Sun (CCNU)
“New Developments on Pixel Tracker”

14:30-15:00 Lei Zhao (USTC)
*“High Speed Data Transceiver
for Particle Physics Experiment”*



15:00-15:20 **Coffee Break**

Flash Talks (5 + 5min Q&A)

Chair: Weijie Fu (Dalian University of Technology)

15:20-15:30 Jianing Li (CCNU)
“Unveiling Critical Behavior of a Conical Ensemble Using Cross-Cumulant in Rapidity Scan”

15:30-15:40 Jin Hu (Fuzhou University)
“Relaxation Time Approximation Revisited and Non-Analytical Structures in Retarded Correlators”

15:40-15:50 Qian Chen (Guangxi Normal University)
“AMPT Model Studies of Net-Baryon Number Fluctuations in High Temperature and Density QCD Matter”

15:50-16:00 Daineng Liu (Fudan University)
“Softening of the Hypertriton Transverse Momentum Spectrum in Heavy-Ion Collisions”

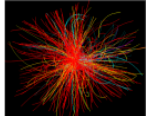
Session 8. Strangeness Production

Chair: Guo-Liang Ma (Fudan University)

16:00-16:30 Xianglei Zhu (Tsinghua University)
“Recent STAR Results on Strangeness Production in Heavy-Ion Collisions”

16:30-17:00 Ang Li (Xiamen University)
“To Quantitatively Determine Neutron Star EOS from Connecting Consistently Nuclear Physics and Astronomy”

17:00-17:30 Jun Xu (Tongji University)
“Studies on the Symmetry Energy of Strong-Interacting Matter”



- 17:30-17:55 Gaochan Yong (IMP, CAS)
*“Probing Phase-Transition Boundary
of Nuclear Matter Based on Heavy-Ion
Collisions Below 10 GeV”*
- 17:55-18:20 Kai Zhou (CUHK-Shenzhen)
*“Extreme QCD Matter Exploration
with Machine Learning”*
- 19:00-21:30 **Banquet at Zui Jiang Lan (醉江澜)**

Day 3 (Monday, November 4)

Session 9. Fluctuations and Correlations

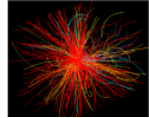
Chair: Defu Hou (CCNU)

- 08:40-09:10 Sourendu Gupta (TIFR)
*“The Physical Phase Diagram
of QCD and Neutron Stars ”*
- 09:10-09:40 Heng-Tong Ding (CCNU)
*“Fluctuations of Conserved
Charges from Lattice QCD”*
- 09:40-10:10 Toshihiro Nonaka (University of Tsukuba)
*“Measurement of Baryon-Strangeness
Correlation at RHIC”*
- 10:10-10:30 **Coffee Break**

Session 10. Di-lepton

Chair: Pengfei Zhuang (Tsinghua University)

- 10:30-11:00 Volker Friese (GSI)
*“Computing and Software
of CBM Experiment”*
- 11:00-11:30 Zaochen Ye (SCNU)
*“Measurement of Dilepton Production
at High Baryon Density”*



Flash Talks (5+5min Q&A)

Chair: Yapeng Zhang (IMP, CAS)

11:30-11:40 Zheng Cao (Shanghai JiaoTong University)
*“Neutron Star and Quark Star
in the Multi-messenger Era”*

11:40-11:50 Sipei Wang (T.D. Lee Institute, SJTU)
*“Extended Skyrme Effective Interactions
for Transport Models and Neutron Stars”*

11:50-12:00 Xingyu Guo (SCNU)
*“Studying Chirality Imbalance with
SU(2) Non-Abelian Gauge Field
Theory via Quantum Computation”*

12:00-12:10 Zhihui Xu (Purple Mountain Observatory)
*“Investigating Dark Matter in
Antiproton Cosmic Rays and
Searching for Antimatte in
Cosmic Rays with DAMPE”*

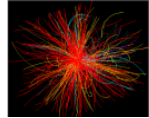
12:10-12:20 Yi Lu (Peking University)
*“Polyakov Loop Potential and QCD
Thermodynamics at Finite Density”*

12:20-12:30 Tribhuban Parida (IISER Berhampur)
*“Role of Stopping and Diffusion of
Baryons in BES Phenomenology”*

12:30-13:30 **Closing Remarks**

Adjourn

Lunch Break (Lunch Box)



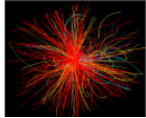
Timetable

<https://indico.ihep.ac.cn/event/22462/timetable>

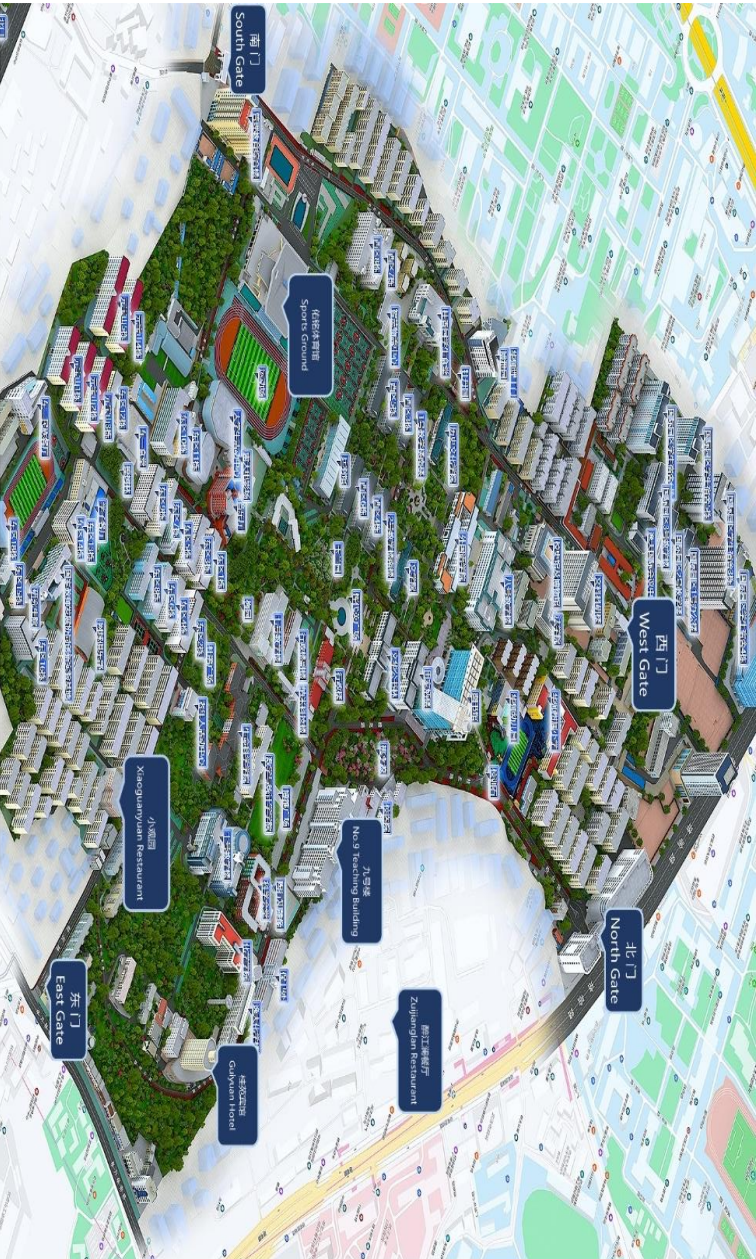
Day 1 (Saturday, November 2)		Day 2 (Sunday, November 3)		Day 3 (Monday November 4)	
08:20-08:40	Opening speech&Photo	08:40-10:10	Session 5	08:40-10:10	Session 9
08:40-10:10	Session 1	10:10-10:40	Coffee Break	10:10-10:30	Coffee Break
10:10-10:40	Coffee Break	10:40-11:40	Session 6	10:30-11:30	Session 10
10:40-12:20	Session 2	11:40-12:10	Flash Talk	11:30-12:30	Flash Talk
12:20-13:30	Lunch Break (Lunch Box)	12:10-13:30	Lunch Break (Gui Yuan)	12:30-13:30	Closing Remarks
13:30-15:30	Session 3	13:30-15:00	Session 7	Adjourn	LunchBreak(Lunch Box)
15:30-16:10	Flash Talk	15:00-15:20	Coffee Break		
16:10-16:30	Coffee Break	15:20-16:00	Flash Talk		
16:30-18:20	Session 4	16:00-18:20	Session 8		
18:30-20:00	Dinner(Xiao Guan Yuan)	19:00-21:30	Workshop Banquet (Zuifang Lan)		

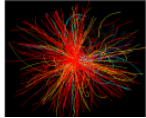
Workshop Secretary : Hui Liu, Ya Ma, Qiang Yuan

Service Team : Liubing Chen, Hanwen Feng, Boyang Fu, Siqi Huang, Xialei Jiang, Yunhui Jia, Yixuan Jin, Luyao Liu, Siyi Li, Ke Mi, Youquan Qi, Xuan Wang, Zhaohui Wang, Mijia Yang, Kehao Zhang, Chenghao Zhu

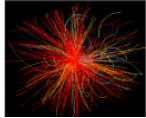


CCNU MAP

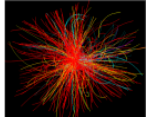




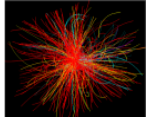
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**College of Physical Science and Technology
Central China Normal University, Wuhan**

**Key Laboratory of Quark and Lepton Physics (CCNU)
Ministry of Education, China**

