

Peking University

- **Founded in 1898, a comprehensive and national top university**
- More than 50,000 students
 - [Sciences](#)
 - [Information & Engineering](#)
 - [Humanities](#)
 - [Social Sciences](#)
 - [Economic & Management](#)
 - Schools of [Medical Sciences](#) and [interdisciplinary](#)
- Playing an essential pioneering role in the course of Chinese modernization



PKU HEP-CMS Group

7 faculties: Yong Ban, Ya-Jun Mao, [Qiang Li](#), Da-Yong Wang, Si-Guang Wang, [Chen Zhou](#), Xiaohu Sun

2 engineers: [Qite Li](#), Z.H.Xue

5 postdocs: Andrew Levin, Antonios Agapitos, Zhiyuan Li, Qianying Guo, ...

30 students

+ One large theo. group focusing on QCD and TeV Physics

In CMS since 1996, Stable support from Government
RPC and GEM ; VBS; $B \rightarrow K\mu\mu$; Boosted Jet



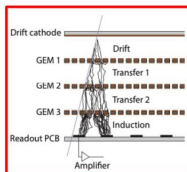
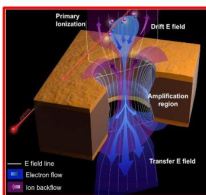
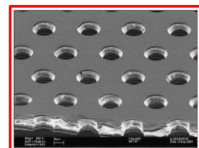
PKU Muon Detector Development



- CMS Muon Trigger RPC: assembled and tested at PKU at around 2002
- RPC R&D for nuclear physics
- CMS GEM upgrade program



北大基地生产的第一个CMS GEM模块



CMS端盖缪子探测器 GEM升级

北京大学、清华大学、中山大学、北京航空航天大学

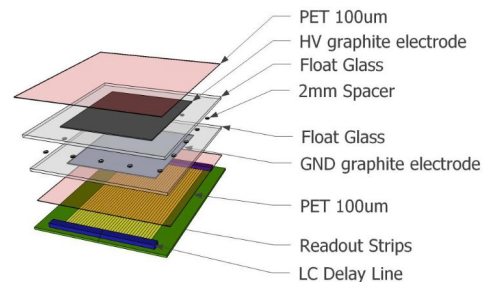
Combination of glass RPC & Delay-line Readout



Study of spatial resolution properties of a glass RPC
Qite Li, Yanlin Ye*, Chao Wen, Wei Ji, Yushou Song, Rongrong Ma, Chen Zhou, Yucheng Ge, Hongtao Liu
School of Physics and State Key Laboratory of Nuclear Physics and Technology, Peking University, Beijing 100871, China

Reference:

- 许金艳, 李奇特*, 等, 物理实验, 41(2021)23
- Qi-Te, Li, et al. *Chinese Physics C* 37 (2013)016002.
- S. Chen, Q. Li*, et al, *JINST*: 10 (2014)10022.



90% R134a+9% i-C4H10+1% SF6 50ml/Min

About me (Qiang Li)

CMS current and past activities:

- Generator L2 co-convener 9. 2018- 9. 2020, responsible for generator related development including software activities inside CMS.
- Generator L3 in the matrix-element and future generator group, 2015-2018
- JETMET MC Contact, 2013-2015
- GEM DPG on seeding and segment 2016-2018
- RPC mechanics 2012-2014,
- Active contributions on physics analyses involving
 - VBS and multi-boson measurements
 - [ICFA Seminar 2023](#)
 - di-boson and tri-boson resonance searches

Others:

- Faculty Member at PKU, China
- Referee for PRL, PRD, JPG; ARC for several analyses
- CSP@CMS Center, DQM shifts@P5
- Chair of CMSDAS2019@Beijing, [MIP2024](#)



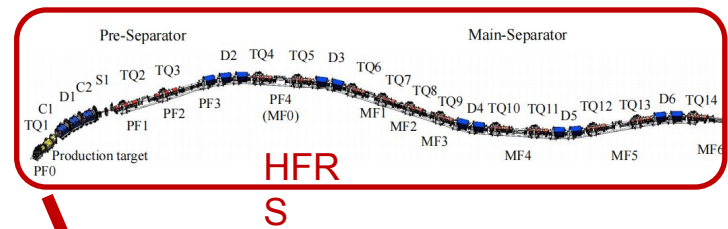
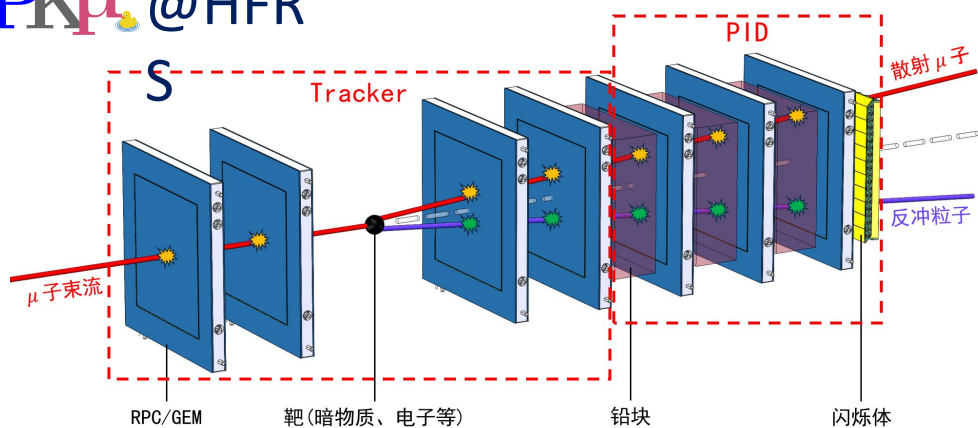
Muon Scattering Experiment at HIAF-HFRS



PKMu(Probing and Knocking with Muons) Proposed by Peking University together with HIAF-HFRS from Institute of Modern Physics, Chinese Academy of Sciences, China: **using 1-10 GeV Muon to probe new physics beyond the Standard Model**

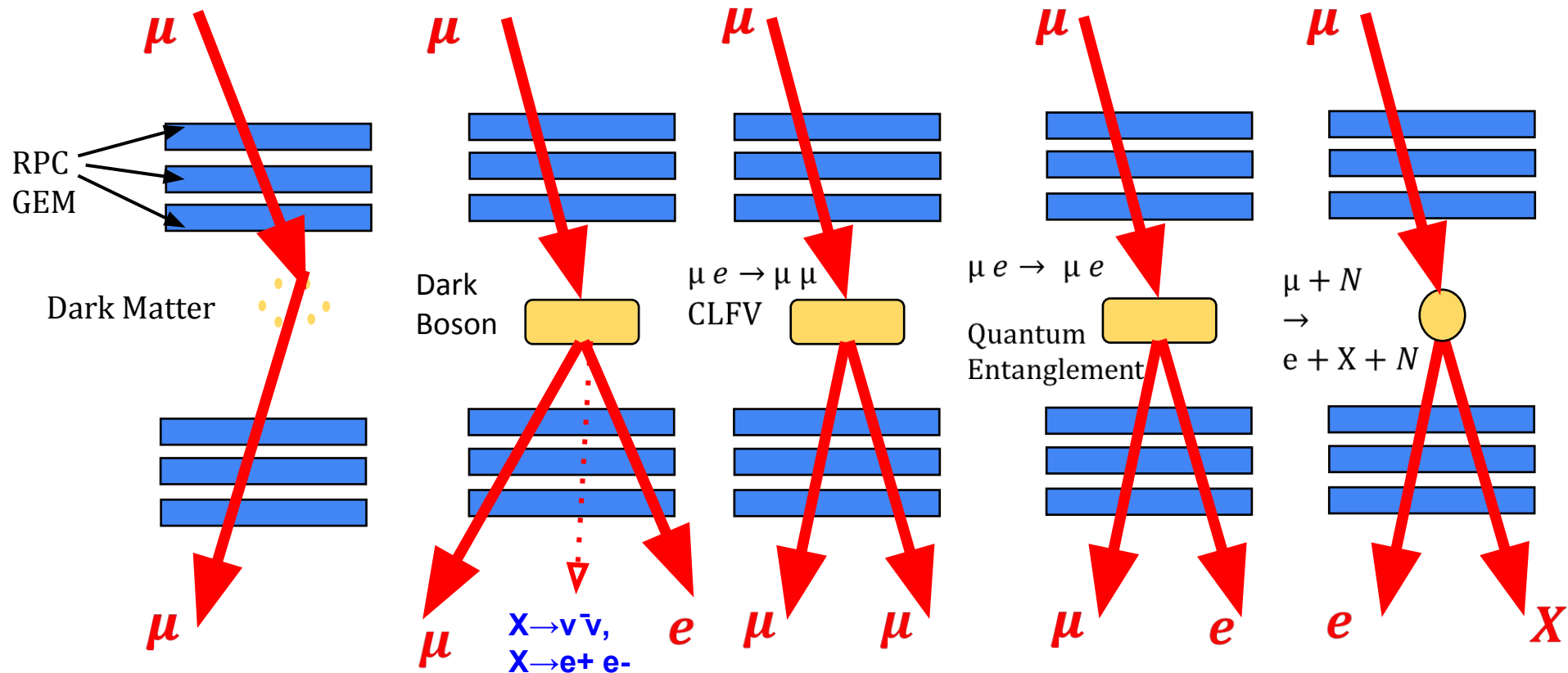
<https://arxiv.org/abs/2502.20915>

PK μ @HFR



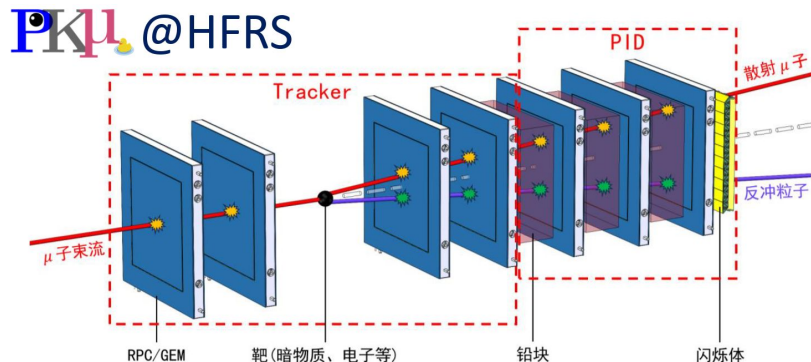
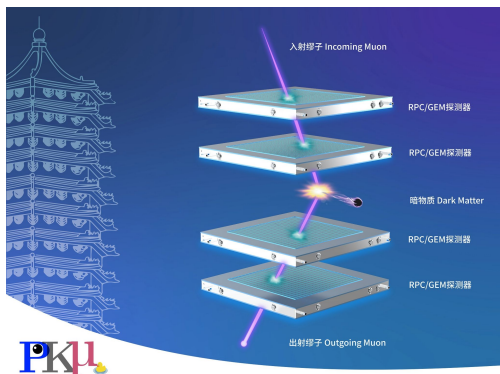
Microscope: multi-purpose platform

→ Cosmic μ or μ beam



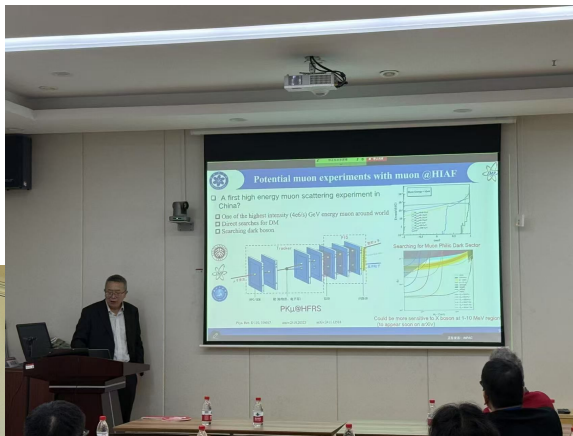
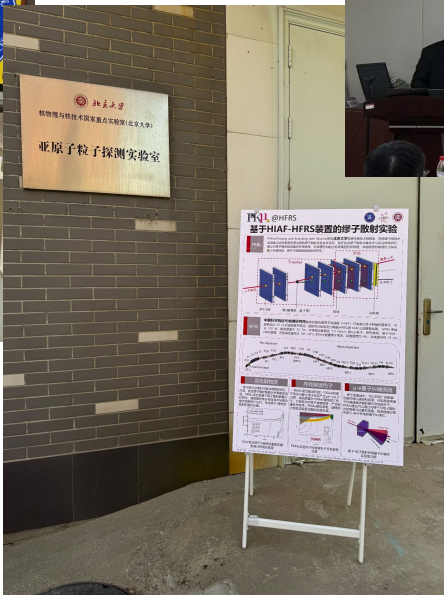
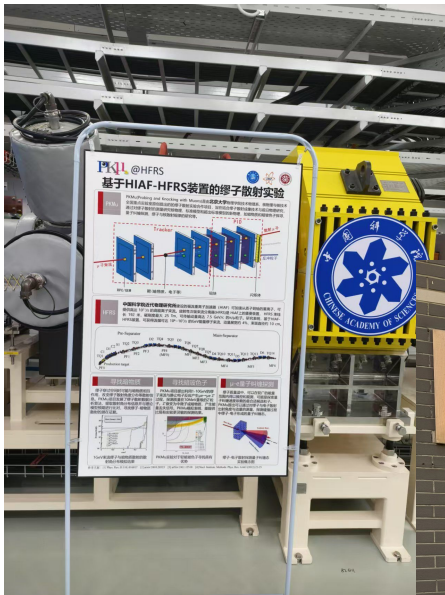
Muon Philic Dark Sector

- Muon Philic Dark Matter may be possible or even necessary!
 - $L_\mu - L_\tau$ gauged model (Z' , χ) quite popular recently
 - 1) Direct searches for DM
 - See the PKMu proposal: *Phys.Rev.D* 110 (2024) 1, 016017
 - 2) On target experiments for Dark Boson: (see also cosmology constraints)
 - LDMX, DarkShine; $eN \rightarrow eNZ'$, $Z' \rightarrow \nu\bar{\nu}$ or $Z' \rightarrow \chi\chi$ (dark matter)
 - NA64 μ , MMM $\mu N \rightarrow \mu NZ'$, $Z' \rightarrow \nu\bar{\nu}$ or $Z' \rightarrow \chi\chi$ (dark matter)
 - MuonE $\mu e \rightarrow \mu e Z'$, $Z' \rightarrow \nu\bar{\nu}$ or $Z' \rightarrow \chi\chi$ (dark matter)



PKMu@HFERS Lab/Collaboration

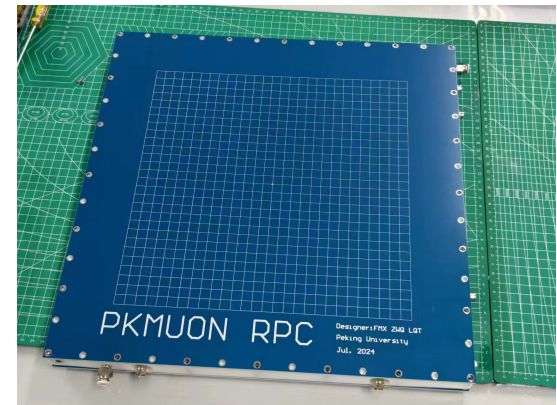
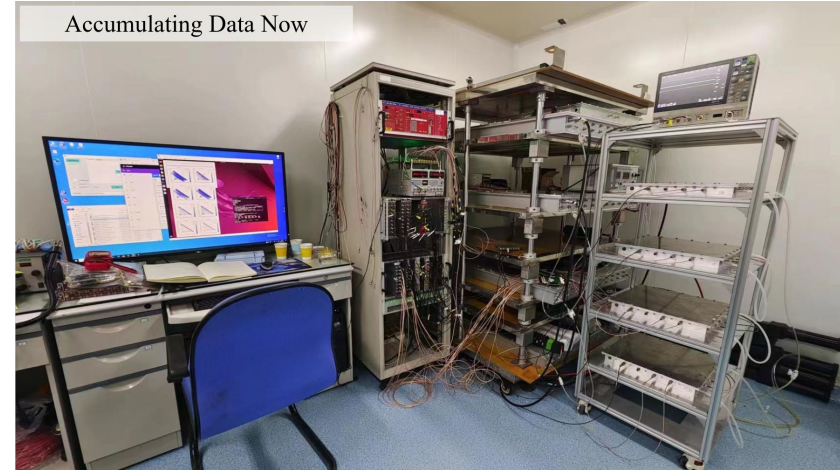
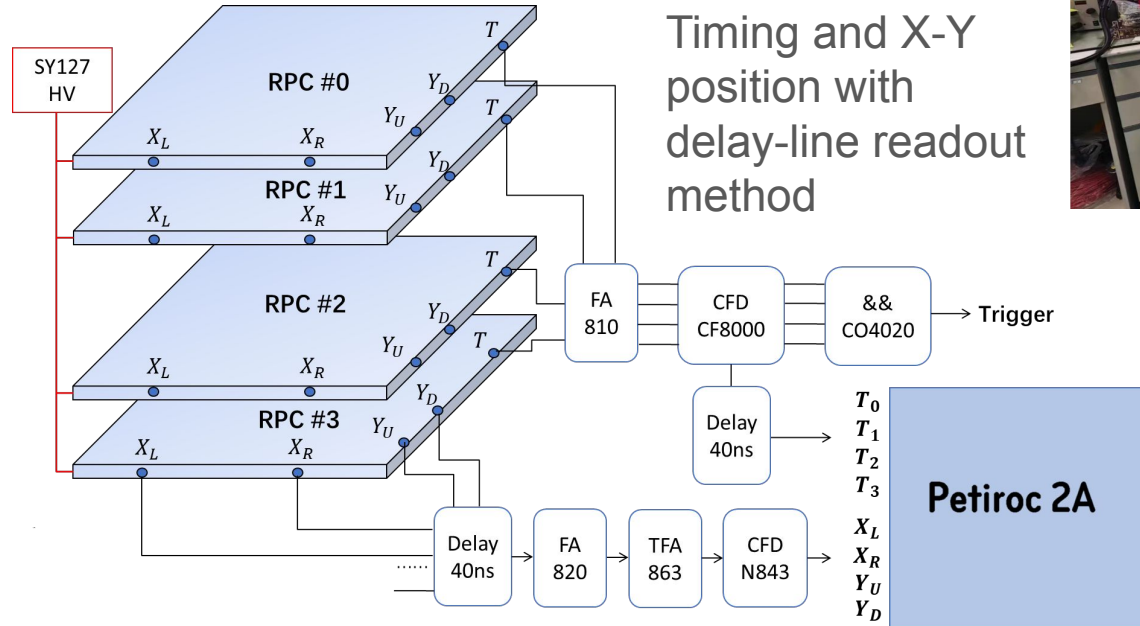
<https://arxiv.org/abs/2502.20915>



Local lab Status

4-station 20cm*20cm RPC for the moment

Petiroc 2A is a 32-channel front-end ASIC



Workshop on Muon Physics at the Intensity and Precision Frontiers (MIP 2024)

19 Apr 2024, 02:00 → 22 Apr 2024, 12:20 Asia/Shanghai

Peking University

MIP2024

Chen Zhou (Peking University (CN)), Qiang Li (Peking University (CN)), Qite Li (Peking University)

Several possible Chinese Muon beams in the near future: Melody, CIADS, HIAF



[Indico] Abstract Acceptance notification (#100) 📧 ✉️

Indico <noreply-indico-team@cern.ch>
to seeson, qiang.li, chen.zhou, liq1985, espp2026.input

Fri 4 Apr, 22:22 (20 hours ago) ★ 😊 ↶ ⋮

🌐 Translate to Chinese (Traditional) ✕

Dear Qiang Li,

We are pleased to announce that your abstract "Probing and Knocking with Muons" with ID #100 has been accepted as input to the 2026 update process of the European Strategy for Particle Physics.

Your submission will be made public and it will be further discussed by the Physics Preparatory Groups and the European Strategy Group. It also constitutes important input for the preparation of the Open Symposium in Venice at the end of June.

Kind regards,
The Strategy Secretariat

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Indico :: Call for Abstracts
<https://indico.cern.ch/event/1439855/>

- PKU is willing to join MUonE, to contribute on Software & Hardware
 - In the meantime, we are also working on a similar project with HIAF muon beam, mainly for new physics searches
- Mr. Leyun Gao (2nd year)
 - 2-3 months' visit (Summer 2025)
 - expertise on software and CMS analysis
 - trained in ISOTDAQ 2024
- Mr. Zijian Wang (1st year), Mr. Youpeng Wu (1st year) and more (e.g. Zixun Kou)
 - 2-3 months' visit (Summer 2025...)
 - 1-2 years' long visit under [CSC](#) program to Liverpool (Youpeng) or CERN (Zijian) (From Spring 2026) Will finish some local tasks before that and can then focus on MUonE
- A joint funding between China and UK/Italy may be possible ([nsfc](#))
 - Also a joint program between MUonE and PKMu
 - Different energy range
 - Complementary Physics Program (we are also interested in studying MUonE's potential on BSM)

<https://www.nsfc.gov.cn/publish/portal0/tab442/info92329.htm>

<https://research.shanghai.nyu.edu/resources/research-grants/funding-opportunities/2024-nsfc-rs-united-kingdom-exchange-and-0>

<https://decode39.com/8382/italy-china-scientific-cooperation-protocol/>