



BERKELEY LAB

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U.S. DEPARTMENT OF
ENERGY

Office of Science

NSD Staff Meeting

Reiner Kruecken

May 28, 2024



Personnel News

Personnel news

ARTICLE · NUCLEAR SCIENCE

Xin-Nian Wang receives 2024 Humboldt Research Award

May 15, 2024

Xin-Nian Wang, a senior scientist in Berkeley Lab's Nuclear Science Division (NSD), has received a prestigious 2024 Humboldt Research Award.



- **Promotions**
 - Damon Todd, Principal SEA

- **Retirements**
 - Kai Vetter
 - Zuting Liu

PMP Process Kick-off

- FY24 Annual Performance Management Process (PMP) begins **Monday, June 3** and ends on **August 30, 2024**.
- Level 1 message on June 3 with **detailed instructions and timelines. Read completely and carefully.**
- **PMP Self Assessments are due by Friday, June 21, 2024**
- **Note to Supervisors:**
 - Please be proactive in already scheduling time with your employees for the period August 12-30.
 - Please consider preparing the input to your employees PMPs in advance of the forms being released to you.
- **Please plan ahead and make the time for completing your parts in the PMP by the deadlines**
- **Review Training, Work Mode, Career Development Plans**

PMP process timeline and deadlines

Monday, June 3	Kick-off: Self-Assessments emailed to eligible Employees
Friday, June 21	Employee Self-Assessments are due to the Supervisor
Friday, July 12	All Supervisor Draft Reviews due for one-up review. Supervisor enters the proposed rating at pmp.lbl.gov
Monday, July 15 - Friday, July 26	One-up Reviewer completes commenting/suggested edits to draft performance review and routes back to Supervisor.
Monday, July 29 - Friday, August 2	Supervisor incorporates one-up reviewer comments and <u>waits for Division approval</u> to Finalize the document. The Division conducts a ratings calibration process.
Monday, August 5 - Friday, August 9	Supervisor will receive Division approval to “Finalize” the document during this time period.
Monday, August 12 - Friday, August 30	After Division approval is received, Supervisor conducts performance review meeting with Employee and obtain Employee’s electronic signature using “HelloSign.”
Friday, August 30	All reviews are due: signed electronically by Employee and Supervisor.

Onboarding Task Force

Members:

- Xin Dong
- Mayerline Estrella
- Dorothy Kenlow
- Erich Leistenschneider
- Shujie Li
- TD MacDonald

Charge:

Review our current onboarding practices and develop recommendations for improvements to ensure that

- the onboarding experience is positive and builds community across programs,
- onboarding of new staff members is done in a consistent way across NSD,
- [onboarding resources provided by the Lab](#) are used to the extent they apply, and
- division specific information is provided consistently.

Onboarding Task Force: Recommendations

Division level:

- Assign owner (“Division Onboarder”) of the onboarding process, responsible for maintaining consistency, assisting supervisors, conducting orientation sessions, and compiling feedback
 - consultation with HR underway
- Periodic Division-Wide Orientation Sessions and guided tour
 - will be implemented
- Onboarding Page in the NSD’s Resources Website
 - already in progress
- Ensure adherence to standardized onboarding process
 - under consideration
- Post-Onboarding Survey and Periodic Review
 - under consideration

Group level:

- Consider implementation of Newcomer Chat Channels, Buddy System – under discussion with Programs

Clarify Supervisor Expectations

- Familiarity with Laboratory’s Onboarding Program
- Facilitation of Access to Division-Wide Resources
- Tailoring of Onboarding Spreadsheets
- Commencement of Career Development Plans
- Engagement with “Division Onboarder”

– will be implemented

Retreat 2024

Organizing Committee :

- Janilee Benitez (co-chair)
- Chris Campbell
- Xin Chen
- Spencer Klein
- Sandra Ritterbusch
- Joanna Szornel
- Mathis Wiedeking (co-chair)

Inventory

- Thank you to the Admin team and custodians for completing the inventory successfully
- **Significant effort each year**
 - we aim to identify ways to make it more efficient where possible
 - please salvage any items that are not used anymore, in particular computers
 - We can provide support for anyone who needs help with data transfer from old computers before they get salvaged
- **Forthcoming survey to all custodians to collect suggestions for improvements**
 - Please note that some things cannot be changed due to DOE contract terms,
 - e.g. no devaluation, no exclusions

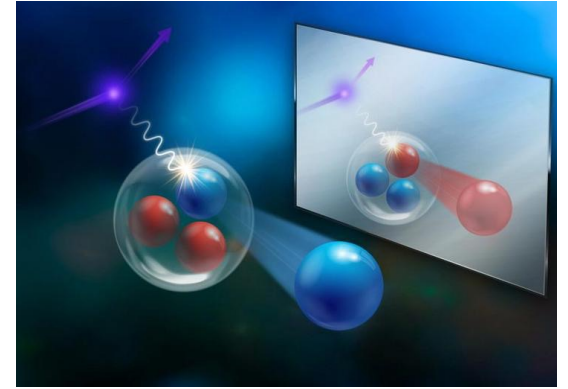


**NSD Staff Appreciation Pizza Lunch.
Tuesday, June 18. 12:00pm. Bldg.
50C-Patio**

Greetings! Please RSVP no later than FRIDAY, JUNE 7...and we look forward to seeing you there!

Research Highlights

Mirror nuclei as a window into the neutron



Neutrons are unstable except when bound in nuclei

^3He is the same as ^3H except that one proton is replaced by a neutron;
 $^3\text{He} - ^3\text{H}$ difference is sensitive to the proton - neutron difference

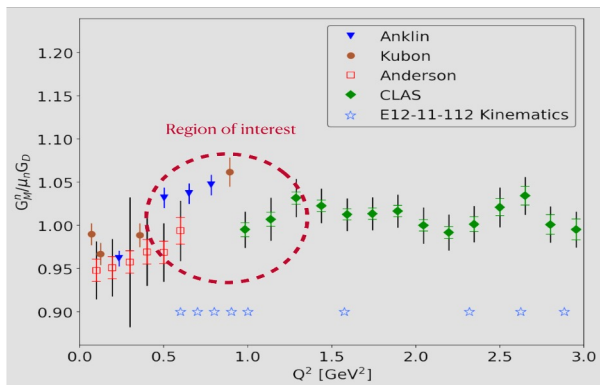
The Jefferson Lab tritium program probed the mirror nuclei ^3He and ^3H ;
 Three analyses supervised by LBNL physicists, including the neutron
 quark distribution and proton vs neutron contributions at high momenta

Latest results: Neutron's magnetic form factor vs energy scale (Q^2)

- Sensitive to the spatial distribution of the quarks' magnetization
- New data resolves discrepancies between previous experiments

Novel Measurement of the Neutron Magnetic Form Factor from $A = 3$ Mirror Nuclei

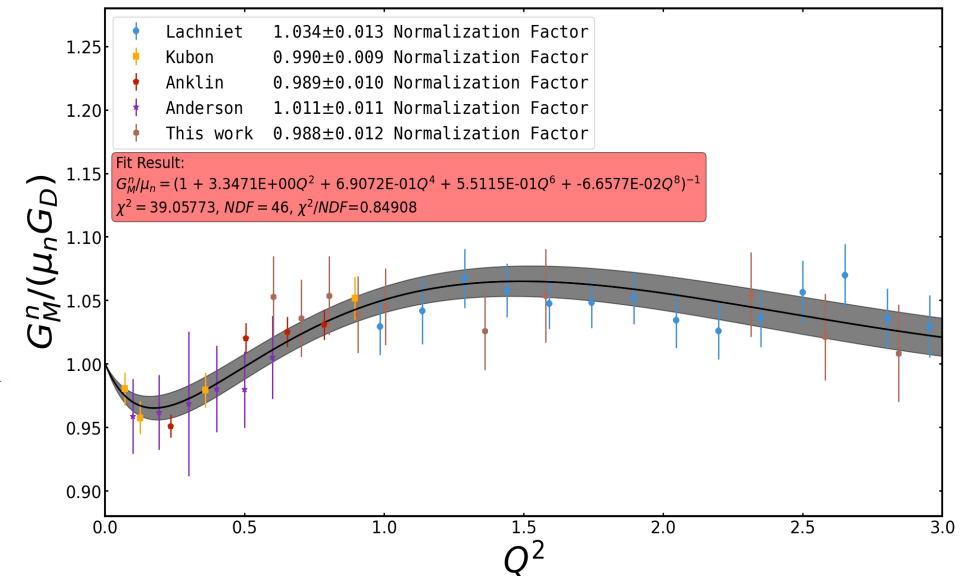
S. N. Santiesteban *et al.* (Jefferson Lab Hall A Collaboration)
 Phys. Rev. Lett. **132**, 162501 – Published 16 April 2024



← Before

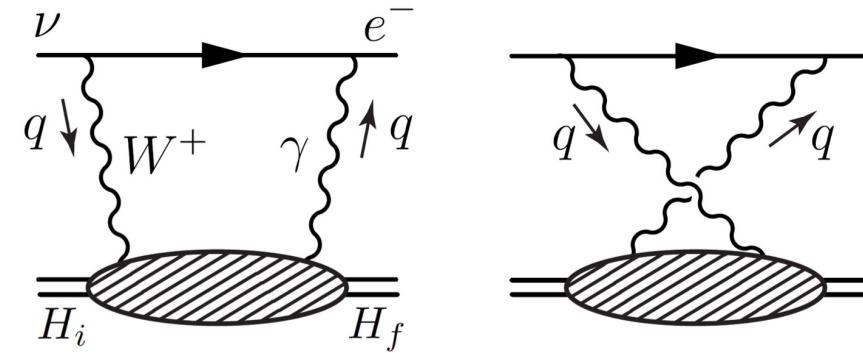
After →

Experiment spokesperson:
 J. Arrington, LBNL



Lattice QCD calculations of electroweak nuclear decays

- First lattice QCD calculation of the universal axial γW -box contribution to both superallowed nuclear and neutron beta decays
- Incorporate long-distance contributions to the hadronic function using the infinite-volume reconstruction method
- Yields a higher value of $|V_{ud}|$, reducing the previous 2.1σ tension with the CKM unitarity to 1.8σ



Open Access

Lattice QCD Calculation of Electroweak Box Contributions to Superallowed Nuclear and Neutron Beta Decays

Peng-Xiang Ma, Xu Feng, Mikhail Gorchtein, Lu-Chang Jin, Keh-Fei Liu, Chien-Yeah Seng, Bi-Geng Wang, and Zhao-Long Zhang

Phys. Rev. Lett. **132**, 191901 – Published 8 May 2024

Keh-Fei Liu, U. Kentucky Emeritus,
resident LBNL Affiliate

Bi-Geng Wang, U. Kentucky, resident
LBNL Affiliated Postdoc

<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.132.191901>

[arXiv:2308.16755](https://arxiv.org/abs/2308.16755)

Coherent K^+K^- photoproduction in ultra-peripheral Pb+Pb collisions with ALICE



Accepted Paper

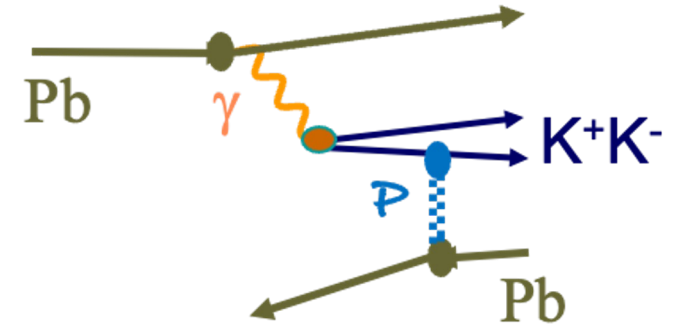
Photoproduction of K^+K^- pairs in ultraperipheral collisions

Phys. Rev. Lett.

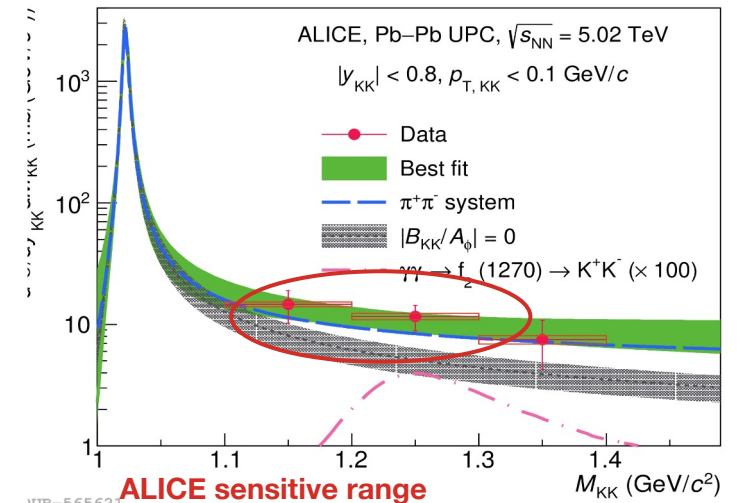
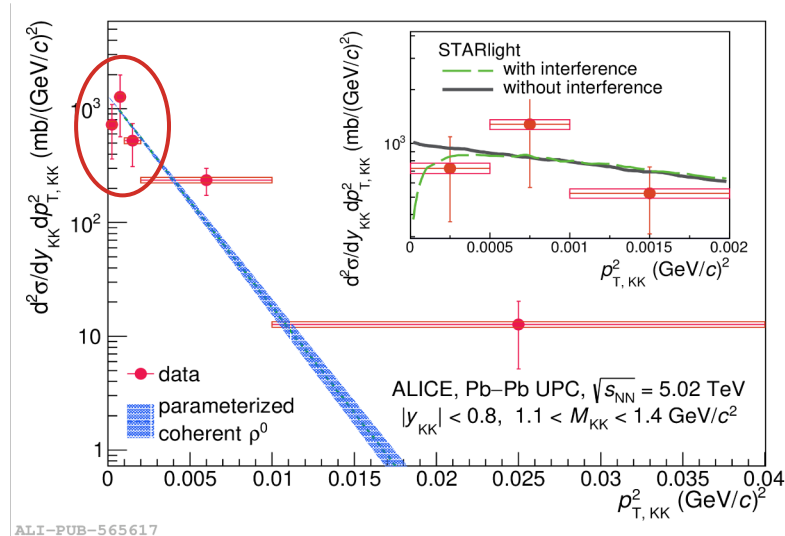
S. Acharya et al.

Accepted 3 May 2024

- **First measurement of photoproduction in ultra-peripheral collisions**
- **New study of Photon-Pomeron interactions using a K^+K^- pairs:** Photons from one nucleus fluctuate to a K^+K^- pair. One of the kaons scatters from the target, and the pair becomes real
- **Despite the mass and flavor differences, similar trend observed between pions and kaons:** Production cross-section ratio between Φ meson and direct K^+K^- pair similar to the one between ρ meson and direct $\pi^+\pi^-$ pair



Low p_T peak: coherent production



Minjung Kim, Spencer Klein, and Mateusz Ploskon of LBL led the first analysis of photons coupling to kaons in ALICE.

Nuclear Theory Research Highlight

PHYSICAL REVIEW LETTERS

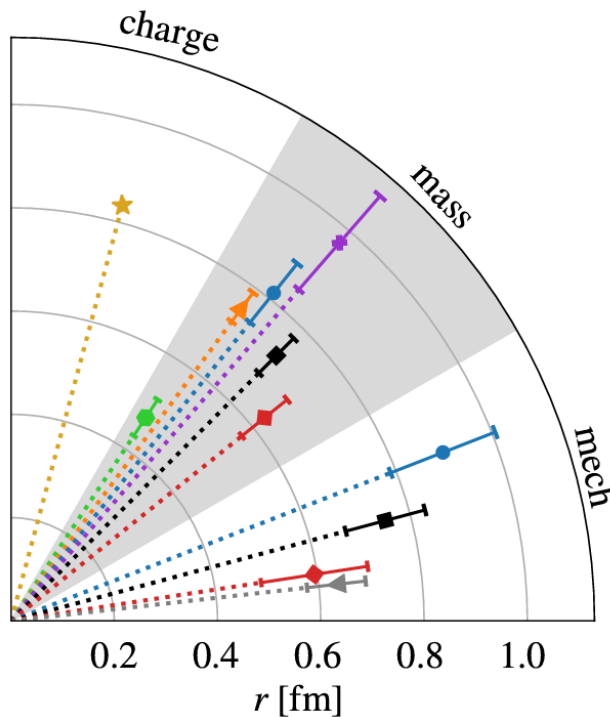
Accepted Paper

Gravitational form factors of the proton from lattice QCD

Phys. Rev. Lett.

Daniel C. Hackett, Dimitra A. Pefkou, and Phiala E. Shanahan

Accepted 22 May 2024



- This work presents a determination of the flavor decomposition of the proton's gravitational form factors
- It provides first-principles constraints on the role of each constituent in generating key proton structure observables, such as its mechanical radius, mass radius, and pressure distribution.

<https://doi.org/10.48550/arXiv.2310.08484>