

The Nuclear Radius Extraction Collaboration (NREC)

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Center for Frontiers
in Nuclear Science



RBRC

RIKEN BNL Research Center



Stony Brook
University

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Nuclear Radius extraction collaboration

- » Loose collaboration of workers in the field
- » Inspired by PREN/HORIZON-2020 + μ ASTI

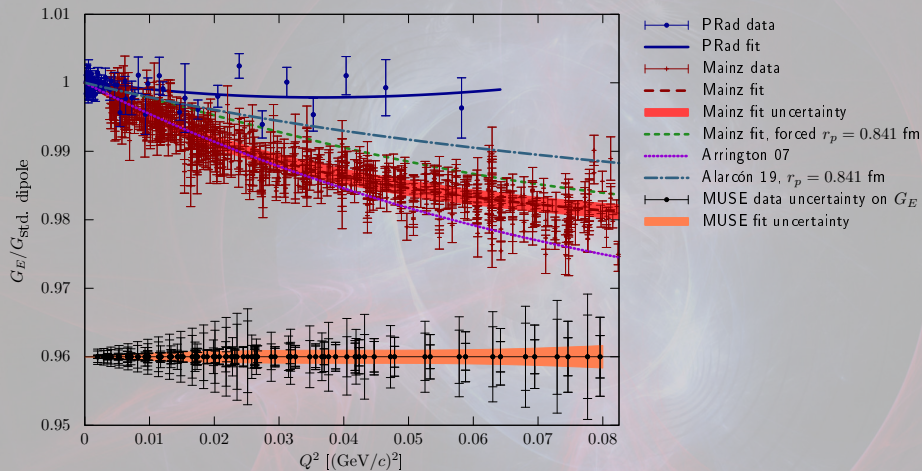
Extraction of radii, and associated topics, are relevant for many subfields.

Can we optimize synergy?

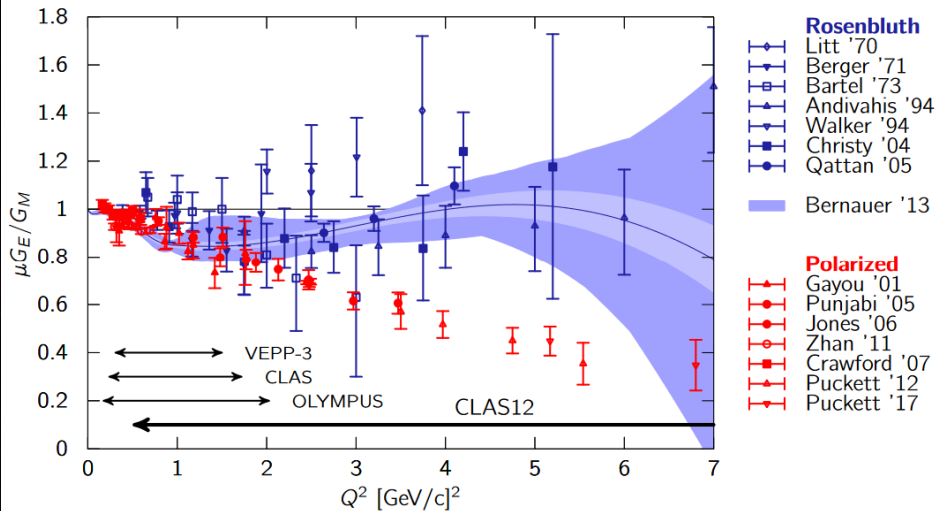
Welcome

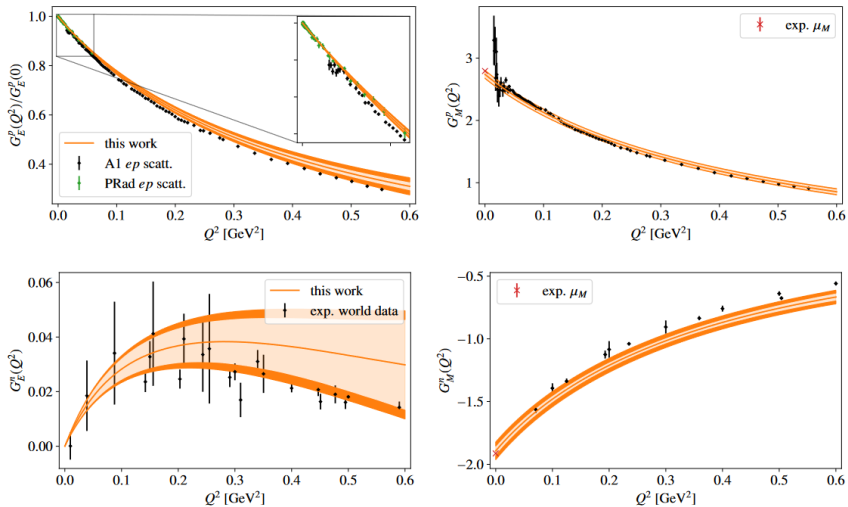


E/M form factors: small Q^2

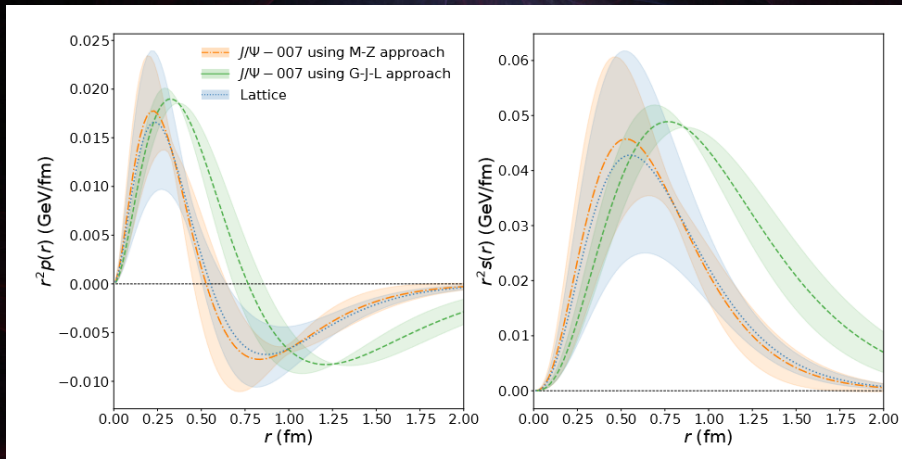


E/M form factors: large Q^2



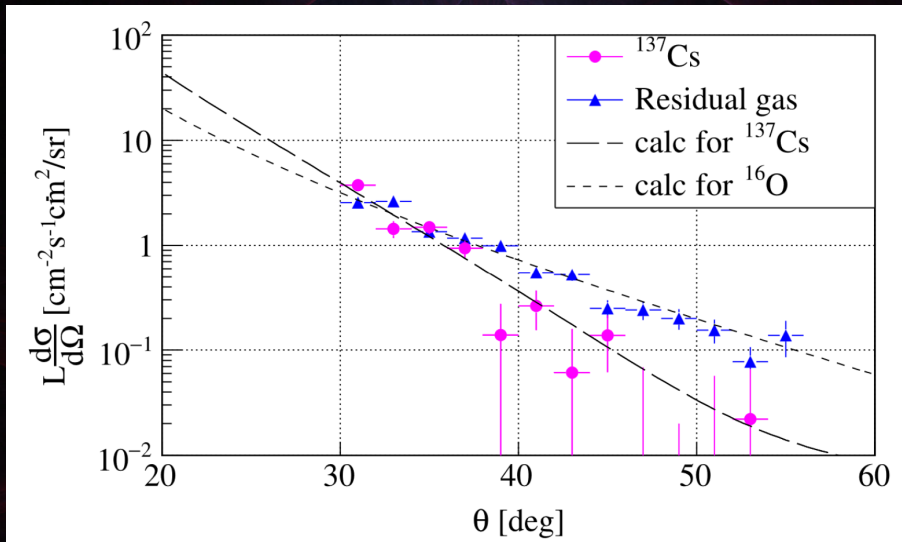


Energy-momentum tensor (gravitational) form factors



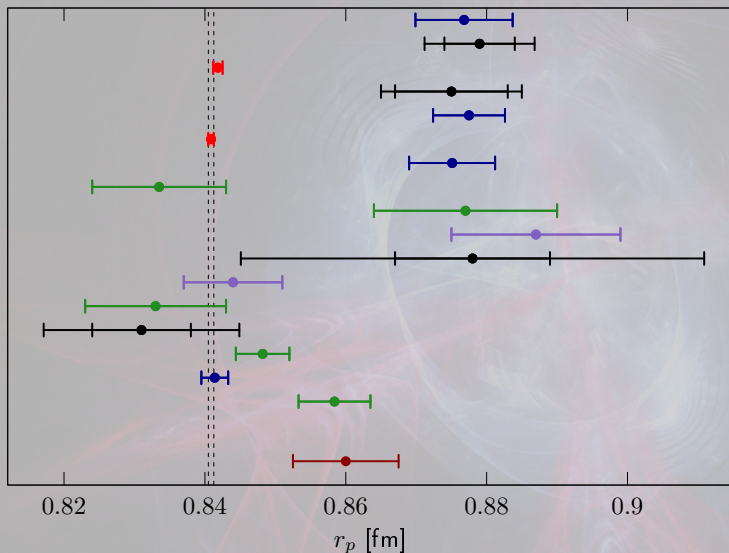
Meziani, arXiv:2403.08423

Short lived-nuclei



Tsukada et al. PRL 131, 092502 (2023)

Radii: e/m



CODATA'06 (2008)
Bernauer (2010)
Pohl (2010)
Zhan (2011)
CODATA'10 (2012)
Antognini (2013)
CODATA'14 (2015)
Beyer (2017)
Fleurybaey (2018)
Sick (2018)
Mihovilović (2019/2021)
Alarcón (2019)
Bezginov (2019)
Xiong (2019)
Grinin (2020)
CODATA'18 (2021)
Brandt (2022)

MUSE (proj.)

More radii

- » Mass/mechanical radii
- » Radii of heavier nuclei
- » Neutron
- » Mesons
- » Exotic hadrons

Radiative Corrections: From Medium to High Energy Experiments

Andrei Afanasev^{1*}, Jan C. Bernauer^{2,3*}, Peter Blunden⁴, Johannes Blümlein^{5*},
Ethan W. Cline^{2*}, Jan M. Friedrich^{6,7}, Franziska Hagelstein^{8,9,10*}, Tomáš Husek^{11,12*},
Michael Kohl¹³, Fred Myhrer¹⁴, Gil Paz¹⁵, Susan Schadmand^{16*}, Axel Schmidt¹⁷,
Vladyslava Sharkovska^{10,18}, Adrian Signer^{10,18*}, Oleksandr Tomalak¹⁹,
Egle Tomasi-Gustafsson²⁰, Yannick Ulrich^{21*}, Marc Vanderhaeghen^{8,9}

Topics

Main topics, not a limitation!

- » Form factors.
 - » Not limited to e/m
 - » Not limited to nuclei
 - » Not limited to experiments
 - » If it's not point-like, it's on topic.
- » Associated radii
- » Radiative corrections
- » Geometry of heavy nuclei, neutron skin

Goals

- » Learn from each other. Sounding board!
 - » Mailing list, website member directory etc.
- » Highlight the significance of the field
 - » Helps with funding for research
 - » And for workshops!
- » Work on published data – we do not want to replace the role of experiments
- » NREC papers: 75% of authors
- » Collaborate with other collaborations, e.g.
 - » PREN
 - » μ ASTI
 - » McMule
 - » JAM
 - » USQCD
 - » PWG

Status

- » Over **100** signees!
- » Logo/website is work in progress
- » **First meeting happening now!**

How do I sign up?

- » Please sign the charter on the overleaf page here:

<https://www.overleaf.com/6259126791cfhhkjbdjspd#5e7c24>

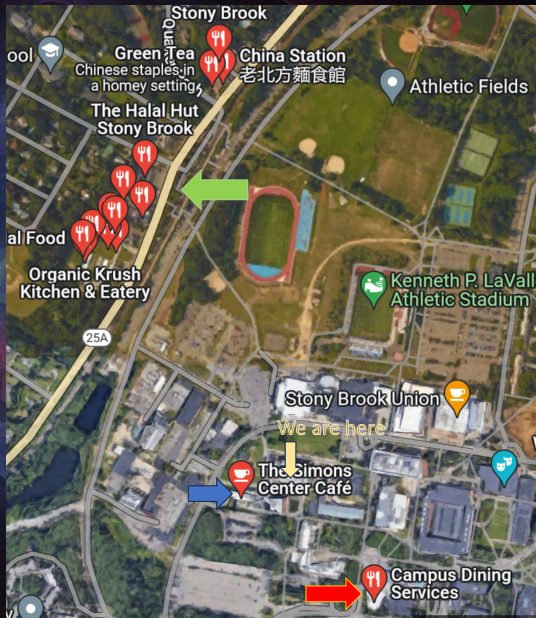
- » This will later move to the website.
- » And of course, you can always retire from NREC.

Logisitics: Parking

» Does anyone need a parking pass?

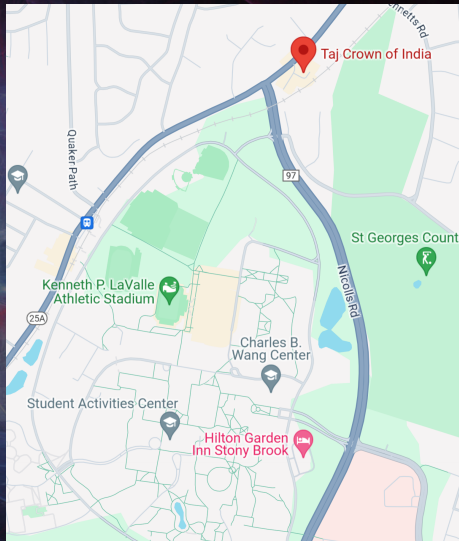
Logistics: Lunch

- » Simon's Café
- » SAC (Campus dining)
- » Halal food, Green Tea, Mexican etc.



Logistics: Conference dinner

Today at 6pm at Taj
Who needs a ride?



Things to think about: Next meeting

- » When? One per year?
- » Where? Maybe Europe, then Asia? (and then bounce between continents?)
- » Please consider whether you want to be the host for the next meeting!

Things to think about: Collaboration

- » Should we have a collaboration council?
- » Spokespeople? If so, any consideration about representation of different communities?
- » Modus of election?
- » Do you want any changes for the charter?

Things to think about: White paper

» See presentations from Vlad, Peter.