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# Report of the Scientific Program Committee

David Richards

*USQCD All-Hands Meeting,  
Jefferson Lab  
May 1-2, 2020*

# Scientific Program Committee

- Alexei Bazavov (Michigan State)

[bazavov@msu.edu](mailto:bazavov@msu.edu)

- Aida El-Khadra → Tanmoy Bhattacharya (LANL)

[tanmoy@lanl.gov](mailto:tanmoy@lanl.gov)

- Jack Laiho (Syracuse)

[jwlaiho@syr.edu](mailto:jwlaiho@syr.edu)

- Meifeng Lin (BNL)

[mllin@bnl.gov](mailto:mllin@bnl.gov)

- Keh-Fei Liu (Kentucky)

[liu@pa.uky.edu](mailto:liu@pa.uky.edu)

- Ethan Neil (Colorado)

[ethan.neil@colorado.edu](mailto:ethan.neil@colorado.edu)

- David Richards (Chair, JLab)

[dgr@jlab.org](mailto:dgr@jlab.org)

We (USQCD and in particular SPC) owe Aida huge debt of gratitude!

# USQCD Resources for 2020-2021

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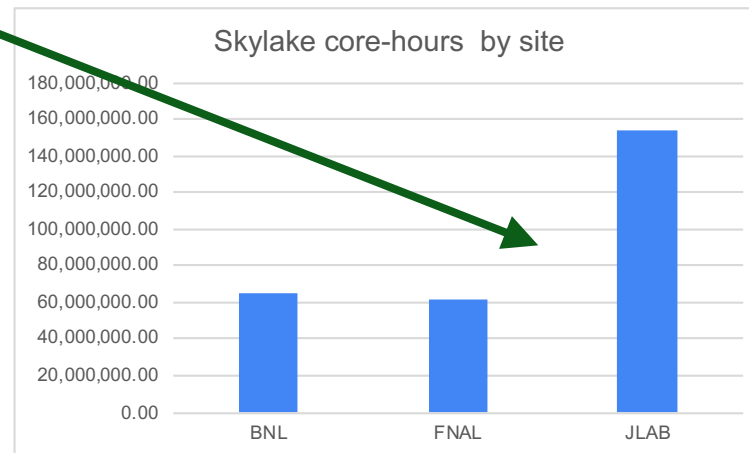
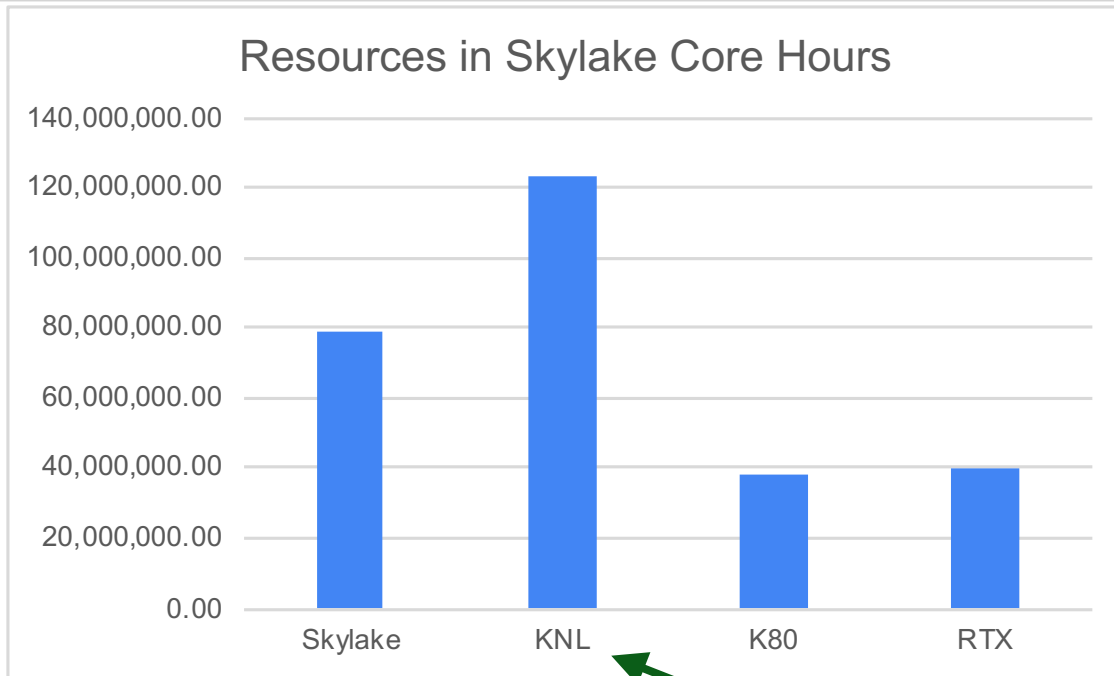
- **78.68M Skylake core-hours** (17.28M BNL, 61.4M FNAL)
  - Last year: 39.5M → 46M *\*Additional resources at FNAL*
- **219.24M KNL core-hours** (16.49M BNL, 202.75M JLab)
  - Last year: 220M
- **1.15M K80 gpu-hours** (BNL)
  - Last year: 1.1M
- **1.84M RTX2080 gpu-hours** (JLab)
  - Last year: 1.84M
- **Additional GPU capacity at JLab → *Supplemental call once specification and capacity known.***

600 TBbyte disk + **600 TByte tape** at BNL

600 TByte disk + 1000 TByte tape at FNAL

1000 TByte disk + 1000 TByte tap at JLab

# Resources in Skylake core-hours



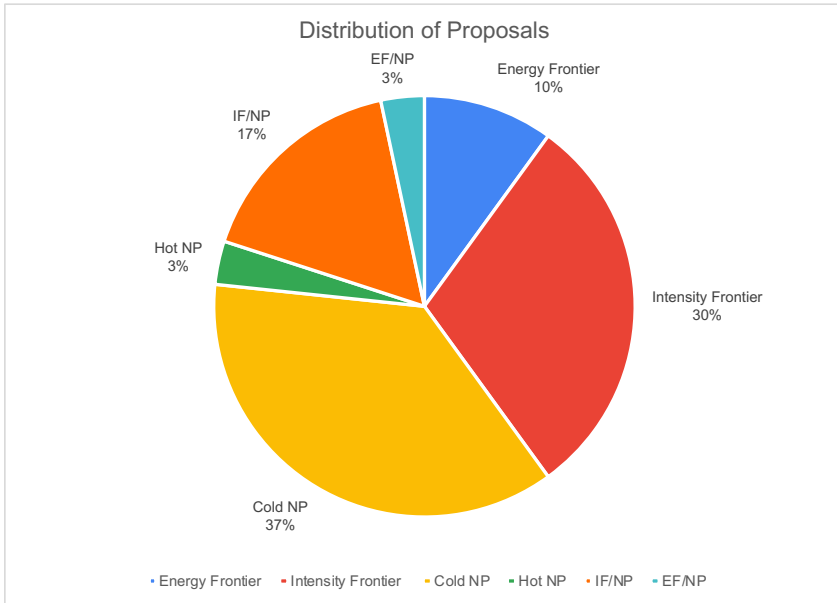
- Timeline follows last year:
  - *Allocations announced 31st May*
- Fairly minimal changes:
  - Continued with google forms interface Aida introduced last year → *google sheets*. Seems to work well.
  - Incorporated “shortened” option for continuation proposals. *Does this reduce effort (for PI and SPC)? ...Not sure...*
  - Some changes in exchange rates to “currency of the realm” (Skylake core-hours), e.g. RTX.

# Proposals for 2020-2021

- 30 Class-A Proposals. *Most are “measurement” jobs, but two gauge-generation: Flavor physics and BSM.*
  - 31 in 2019-2020, 31 in 2018-2019
- 1 Class-B Proposal in 2019-2020(??). *Suggested maximum 500K Skylake core-hours/25K K80 gpu-hours. 6 month duration. Can be submitted any time throughout the year - but would like to discourage “serial submissions”.*
  - 3 in 2018-2019, 3 in 2017-2018
- Class C. *20K Skylake core-hours/2K K80 gpu-hours.*
  - BNL: Peter Boyle ([pboyle@bnl.gov](mailto:pboyle@bnl.gov))
  - FNAL: Jim Simone ([simone@fnal.gov](mailto:simone@fnal.gov))
  - JLab: Robert Edwards ([edwards@jlab.org](mailto:edwards@jlab.org))

# Distribution of Class A: by Area

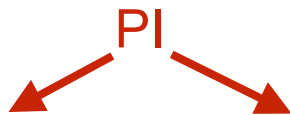
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- Energy Frontier (EF) - 3
  - BSM: Composite Higgs, etc.
- EF/NP - 1
  - Strange-quark matrix elements
- Intensity Frontier (IF) - 9
  - 2  $g-2$
  - 7 flavor physics
- Cold NP - 12
  - 2 Spectroscopy
  - 2 Nuclear ME, incl.  $0\nu NN$
  - 2 nEDM, single-particle ME
  - 6 Structure: 1D and 3D
- Hot QCD - 1
- IF/NP - 5
  - NP important for HEP, e.g. DUNE
  - Both NP and HEP

*My takeaway - both NP and HEP have more than 50% of proposals with important impact for their area.*

# Class-A Proposals



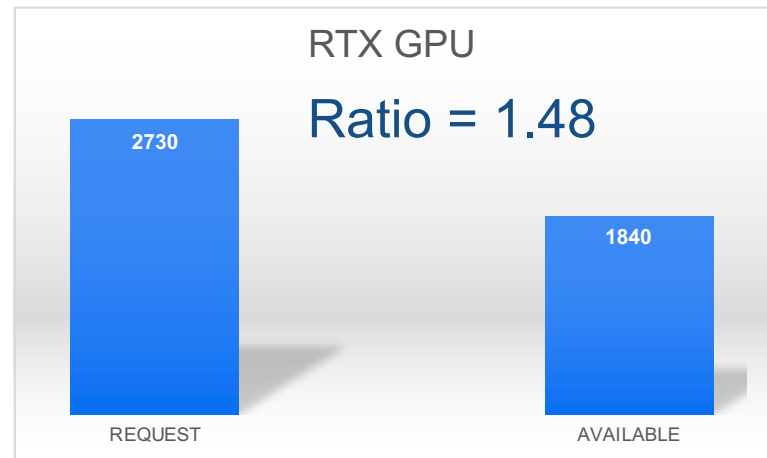
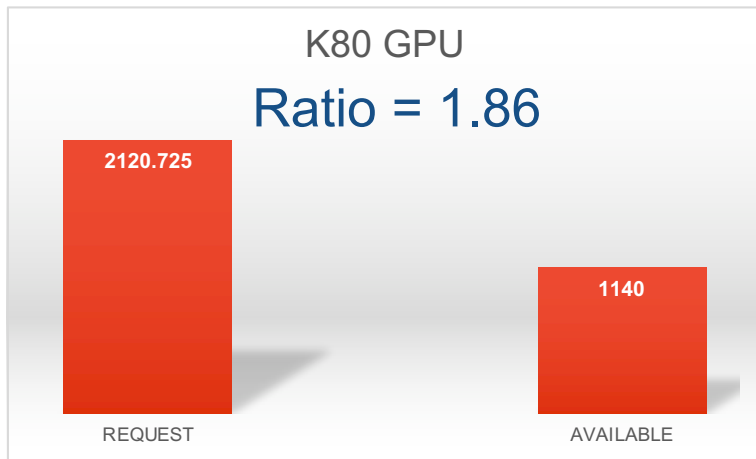
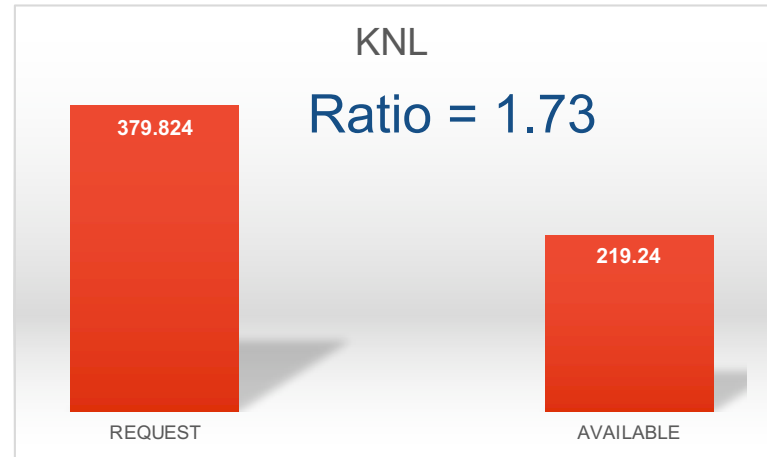
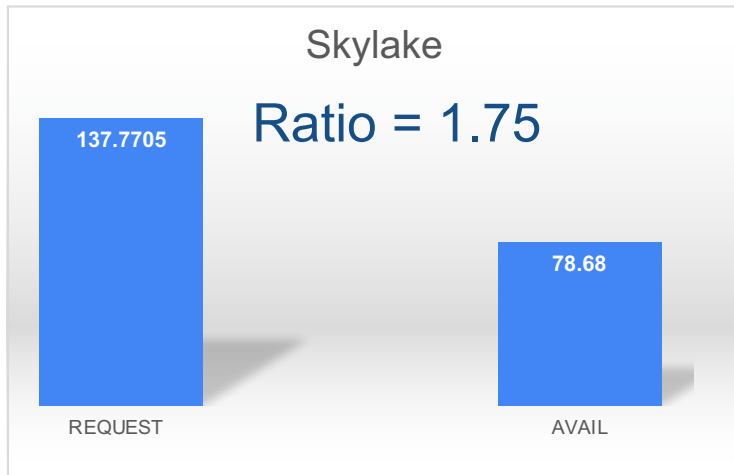
Title

Field Continuation?

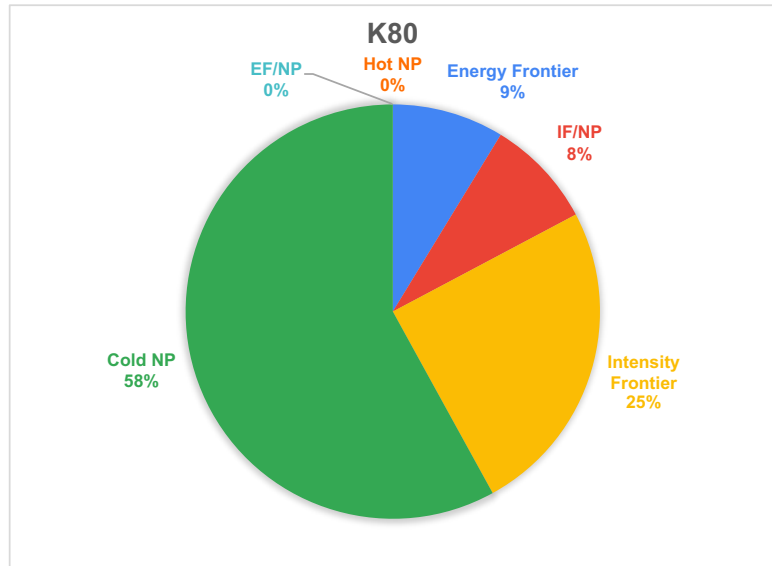
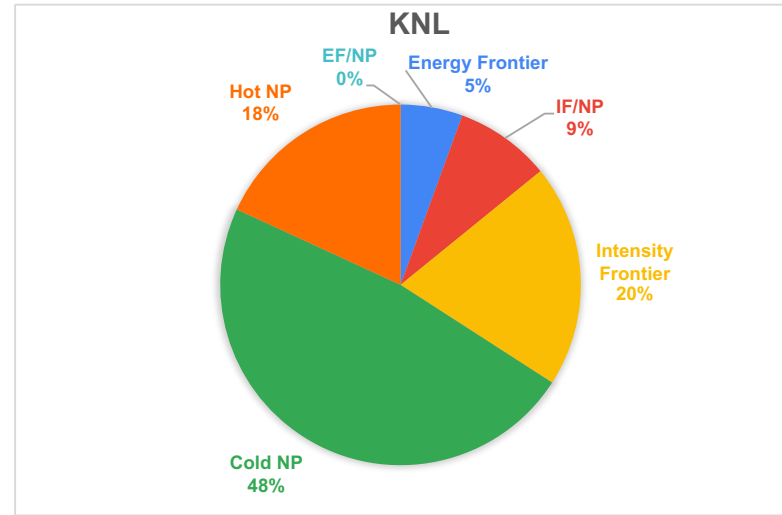
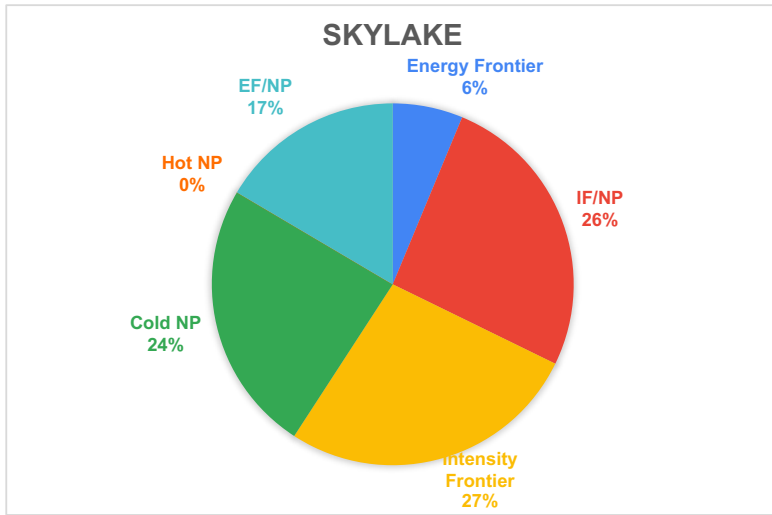
PI	PI	Title	Field	Continuation?
Witzel	Oliver	Composite Higgs model with four light and six heavy flavors	EF	Yes
Hasenfratz	Anna	Gradient flow beta function for 8 fundamental flavors	EF	Yes
Kuti	Julius	Walking, the dilaton, the light $\sigma$ -particle, and the sextet BSM model: 2020-2021	EF	Yes
Jin	Luchang	Continuation: QCD+QED studies	IF/NP	Yes
Blum	Thomas	$K \rightarrow \pi \pi$ decay calculations at the physical point	IF	Yes
DeTar	Carleton	Semileptonic B- and D-meson form factors with high precision	IF	Yes
Van de Water	Ruth	Muon $g-2$ Hadronic Vacuum Polarization from four flavors of sea quarks...	IF	Yes
Soni	Amarjit	Semi-leptonic $B_c$ decays	IF	Yes
Izubuchi	Taku	Nucleon Physics with Distillation for Neutrino Oscillations and CKM Matrix Elements	IF	Yes
Bazavov	Alexei	New ensembles for precision light-meson decay constants	IF	No
Tomii	Masaaki	Non-perturbative matching of three/four-flavor Wilson coefficients with a.....	IF	Yes
El-Khadra	Aida	Exclusive channel contributions to the hadronic vacuum polarization in Lattice QCD	IF	No
Jang	Yong-Chull	Determination of $V_{cb}$ from Semi-leptonic Decays using the Oktay-Kronfeld Action	IF	Yes
Liu	Keh-Fei	Neutrino Nucleon Scattering from Hadronic Tensor	IF/NP	Yes
Kronfeld	Andreas	The Nucleon Axial-Vector Form Factor at the Physical Point with the HISQ Ensembles	IF/NP	Yes
Bhattacharya	Tanmoy	Contribution of Theta, cEDM and Weinberg operators to nEDM	IF/NP	Yes
Syritsyn	Sergey	Calculation of nucleon axial form factors, proton decay amplitudes, nucleon EDMs...	IF/NP	Yes
Liang	Jian	Lattice calculation of nucleon form factors and EDM using overlap fermions	NP	Yes
Edwards	Robert	Meson Resonances and their Couplings from Anisotropic Clover Lattices	NP	Yes
Mukherjee	Swagato	The chiral limit of (2+1)-flavor QCD and the axial anomaly at high temperature	NP	No
Constantinou	Martha	Quasi-GPDs from Lattice QCD	NP	Yes
Lin	Huey-Wen	Precision Moments of Strange Parton Distribution Functions from Lattice QCD	EF/NP	No
Karthik	Nikhil	Computing Pion Generalized Parton Distribution on Fine Lattices	NP	Yes
Murphy	David	Nuclear Matrix Elements for Neutrinoless Double Beta Decay from Lattice QCD	NP	Yes
Culver	Christopher	Lattice Study of the $a_1(1260)$ Resonance	NP	No
Detmold	William	Nuclear Physics from the Standard Model USQCD Proposal for 2020-2021	NP	No
Richards	David	Parton Distribution Functions and Amplitudes...	NP	Yes
Hackett	Daniel	Generalized form factors of the proton	NP	No
Gupta	Rajan	Nucleon Matrix Elements with 2+1 flavor clover fermions	NP	Yes
Engelhardt	Michael	Nucleon Quark-Gluon Structure with Clover-Wilson Fermions	NP	Yes



# Distribution of Class A: By Resource <sup>9</sup>



# Distribution across Resource



RTX → NP

Quite a few proposals are either one or the other: e.g. memory problems few and far between on RTX gamers.

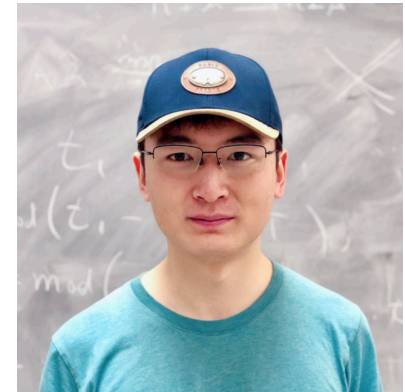
# Next Steps

- Thank you all for responding to the questions!
  - Came in on time
  - We are reviewing them now....
- Recommend allocations:
  - scientific merit
  - alignment with USQCD goals, and those of US HEP/NP programs
  - Efficient use of resources
  - avoid duplication of effort, redundancy - *though that can be needed, e.g. g-2.*
  - balance between HEP and NP

- Agenda of AHM - *thank you Ethan*.
- Work with Site Managers and EC:
  - Efficient assigning of projects to resources
  - Jeopardy policies and implementation.
  - Respond to new/changes in resources throughout the allocation year, *e.g. at FNAL in Fall 2019*.
- Work with EC on broader USQCD program
  - e.g. INCITE, Whitepapers, reviews.
- Fulfill role of *Nominating Committee* for elected member of Executive Committee
  - *Three outstanding candidates who have agreed to stand*

### Luchang Jin

Luchang Jin graduated from Columbia University in 2016. Supervised by Norman Christ, his Ph.D. thesis focused on the lattice calculation of the hadronic light-by-light contribution to muon anomalous magnetic moment. He then worked at Brookhaven National Lab for one year and studied calculating the parton distribution functions using lattice QCD. Currently, Luchang serves as an RHIC Physics fellow at RBRC and an Assistant Professor at the University of Connecticut. His recent works include the lattice calculation of the hadronic contributions to muon  $g-2$ , neutrinoless double beta decay, parton distribution functions, and the QED corrections to hadron masses and meson (semi-)leptonic decays.



### Huey-Wen Lin

Huey-Wen Lin received her PhD from Columbia University in the City of New York. She was a postdoctoral fellow in the theory division at Jefferson Lab, a research assistant professor at the University of Washington, visiting assistant professor at the University of California, Berkeley, before becoming an assistant professor at Michigan State University. Her past research covers heavy-quark physics, hadron spectroscopy and interactions, and recently focuses on hadron structure and fundamental symmetries. She won a 2017 NSF Early-Career Award for her work on the Bjorken- $x$  dependence of parton distribution functions and was one of the 25 recipients of 2020 Cottrell Scholar Awards. She was chair for the Lattice 2018 Conference, lead organizer of the INT Lattice-QCD Summer and elected chair for the 2020 Gordon Conference on Photonuclear Reactions, a prestigious conference series started in 1959. She is co-author for the 2019 USQCD whitepaper for "Hadrons and Nuclei" and "Lattice QCD and Neutrino-Nucleus Scattering", and co-editor for the "Lattice QCD for Nuclear Physics" lecture note by Springer. She has been a fervent supporter of women and minorities in physics, initiating the Women in Lattice QCD luncheon, which now has become an annual event at the Lattice Conference.



### Sergey Syritsyn

Sergey Syritsyn began studying lattice gauge theory in 2003 in Mikhail Polikarpov's lattice theory group at ITEP, Moscow where he explored the nonperturbative vacuum of  $SU(2)$  gluodynamics in terms of topological defects. After completing his master's thesis, he joined the MIT Center for Theoretical Physics to explore nucleon structure and form factors with John Negele as PhD advisor. After graduation in 2010, Sergey moved to the Lawrence Berkeley Lab and continued working towards calculation of nucleon structure at the physical point as a postdoctoral associate. From 2013-2015, Sergey worked with the RBC collaboration on neutron oscillations and electric dipole moments as a RIKEN foreign postdoctoral researcher. Dr. Syritsyn was a Nathan Isgur fellow at Jefferson Lab for a year 2015-2016, after which he accepted a Junior Faculty position at the Nuclear Theory group of the Stony Brook University (SUNY).



# For this meeting....

- If you wish to ask question, or contribute to round table
  - Use chat - to everyone
  - In general, not necessary to pose question in chat, just say you want to contribute
  - Chairman will go through the list...
- Please remember to “unmute” before speaking, and “mute” afterwards!
- SPC Round Tables: speakers have been invited explicitly, but everyone should participate.