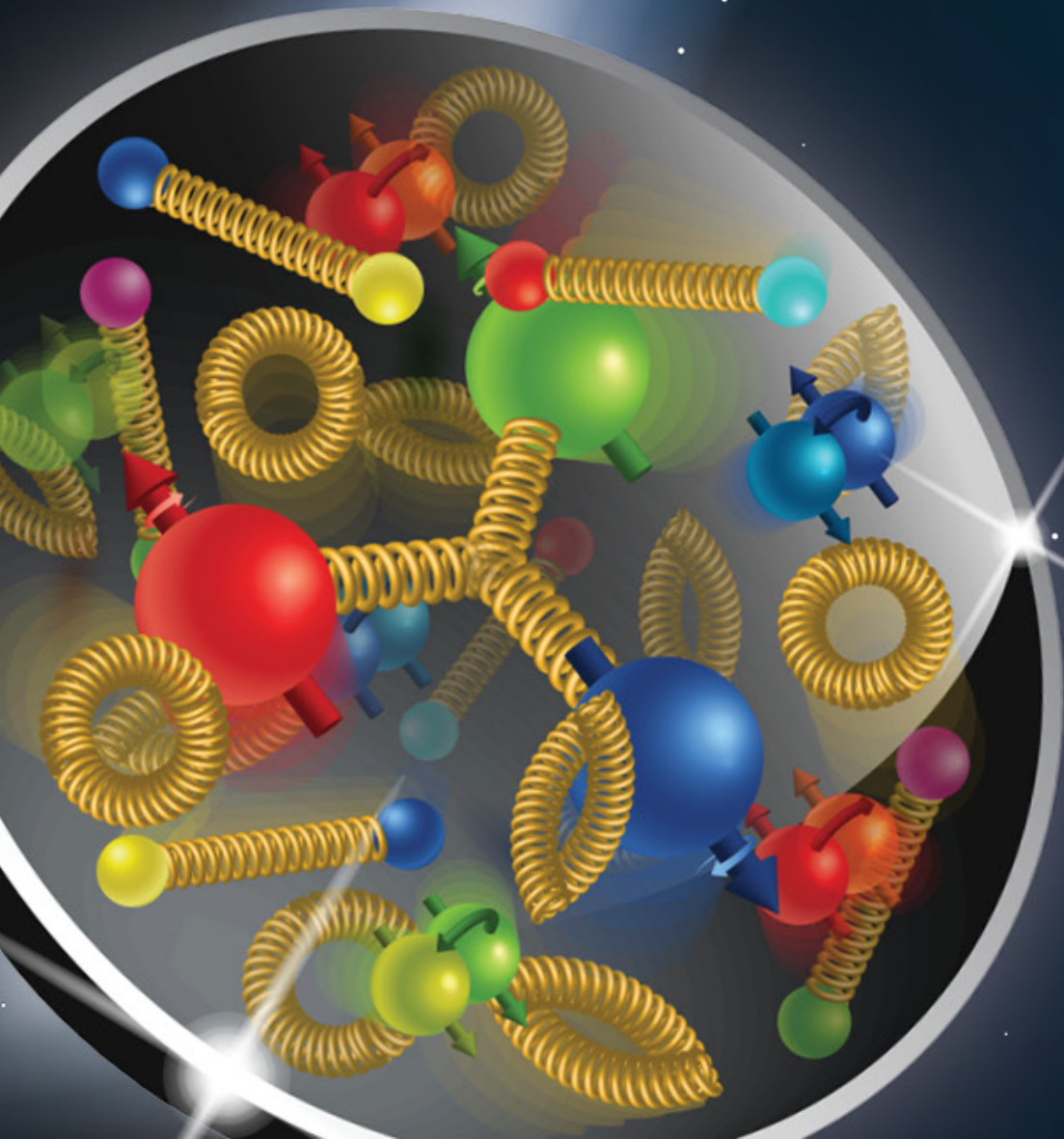


The 2022 CFNS Summer School

Alexei Prokudin

Pennsylvania State University Berks and Jefferson Lab



WELCOME TO THE 2021 CFNS SUMMER SCHOOL

Welcome to the 2022
CFNS Summer School
dedicated to the physics
of the Electron-Ion
Collider

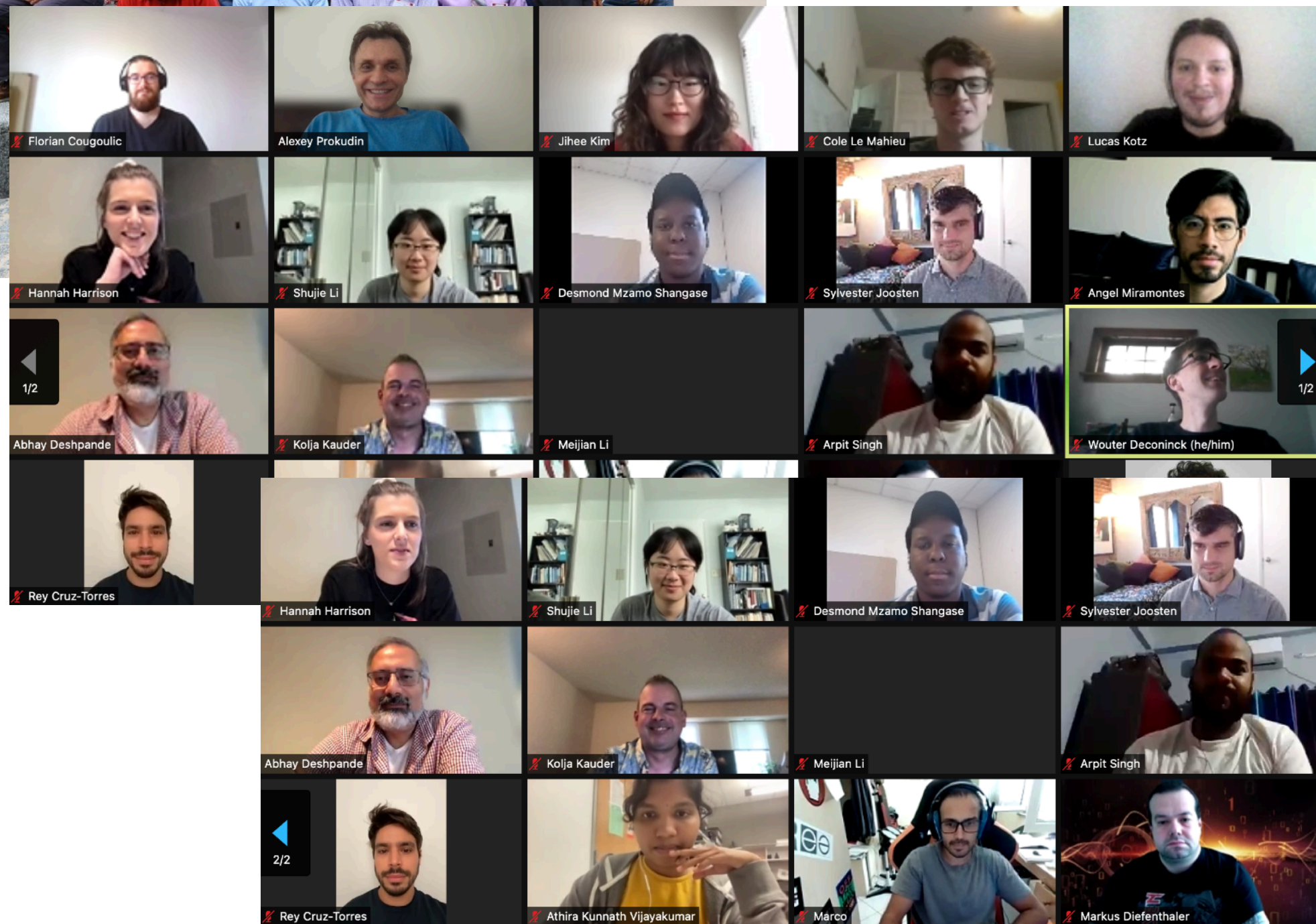
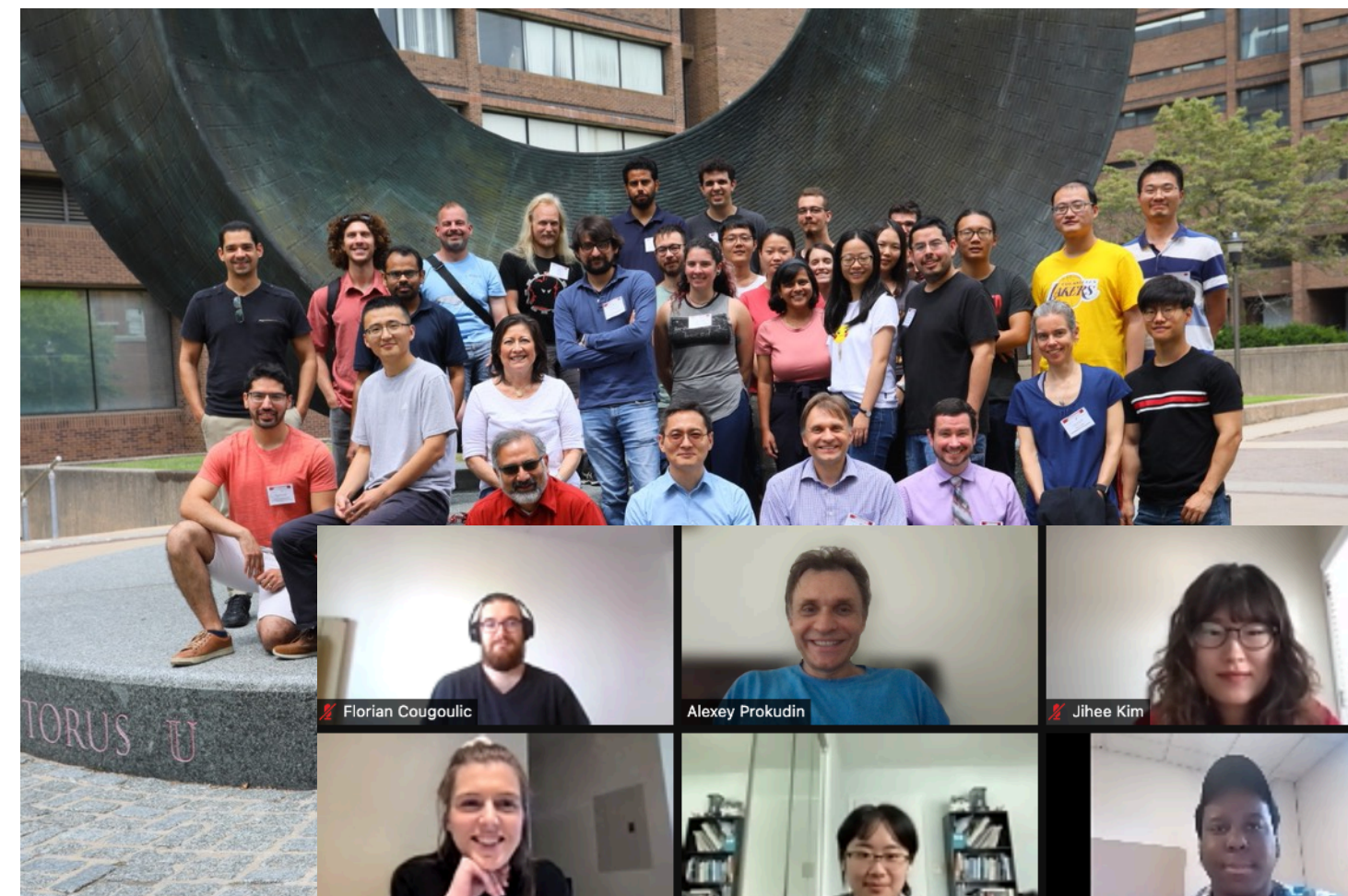


It is our third School, the
first was in 2019 with 25
students
the second was online in
2021 with 63 students

The Electron-Ion Collider is at a
very mature stage and your
participation in the project is crucial
for its success!

We have 20 in-person
students this year and 30+
online students and we are
looking forward to a very
exciting time

MER SCHOOL



THE SCHOOL ORGANIZERS

Organizing Committee:

- Ross Corliss (SBU)
- Abhay Deshpande (SBU, CFNS Director)
- Wenliang “Bill” Li (SBU)
- Mriganka Mondal (SBU)
- Alexei Prokudin (PSU, School Chair)

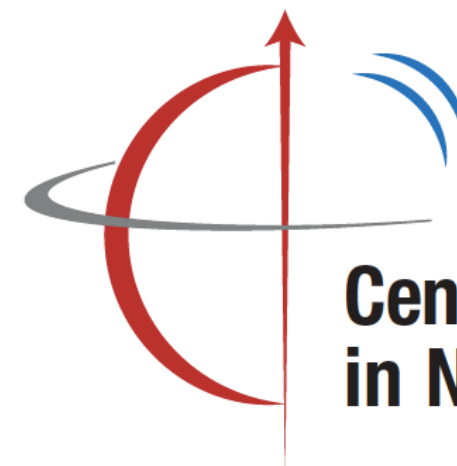


Administrative support:

- Socorro Delquaglio (SBU)
- Rachel Nieves (BNL)
- Marlene Vera-Viteri (SBU)

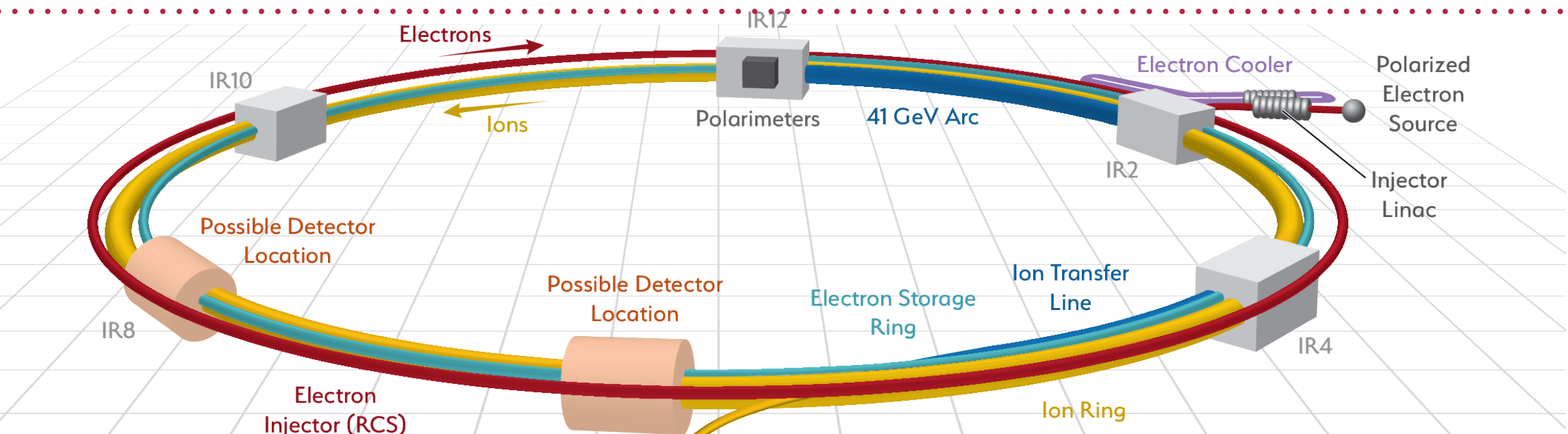
International Advisory Committee:

- Amber Boehnlein (JLAB)
- Martha Constantinou (Temple)
- Marta Ruspa (INFN, Italy)
- Ralf Seidl (RIKEN, Japan)
- Thomas Ullrich (BNL)



**Center for Frontiers
in Nuclear Science**

THE ELECTRON-ION COLLIDER @ BNL



- High luminosity: ($\sim 10^{33} - 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$) (~ 1000 times that of HERA)
- **Variable** CM energy: **20 — 100 GeV** upgradable to **140 GeV**
- Highly polarized **$\sim 70\%$** electron and **$\sim 70\%$** nucleon beams
- Ion beams from deuterons to heavy nuclei such as gold, lead, or uranium
- Possibility of more than one interaction region (none of the major facilities operates with one detector only - important for discovery potential)

White Paper (2012)
Accardi et al, arXiv:1212:1701

THE ELECTRON-ION COLLIDER: SCIENTIFIC QUESTIONS

White Paper (2012)

Accardi et al, arXiv:1212:1701

- How do the nucleonic properties such as mass and spin emerge from partons and their underlying interactions?
- How are partons inside the nucleon distributed in both momentum and position space?
- How do color-charged quarks and gluons, and jets, interact with a nuclear medium? How do the confined hadronic states emerge from these quarks and gluons? How do the quark-gluon interactions create nuclear binding?
- How does a dense nuclear environment affect the dynamics of quarks and gluons, their correlations, and their interactions? What happens to the gluon density in nuclei? Does it saturate at high energy, giving rise to gluonic matter or a gluonic phase with universal properties in all nuclei and even in nucleons?

THE SCHOOL LECTURERS: FIRST WEEK



Barbara Pasquini (Pavia, Italy)



Chris Monahan (William&Mary)



Abhay Deshpande (SBU)



Tom Mehen (Duke)



Liz Sexton Kennedy (FNAL)



Thomas Ullrich (BNL)

THE SCHOOL LECTURERS: FIRST WEEK



Markus Diefenthaler (JLAB)



Sylvester Joosten (ANL)



Bjoern Schenke (BNL)



Klaus Dehmelt (SBU)

THE SCHOOL LECTURERS: SECOND WEEK



Oleg Eyser (BNL)



Rabah Khalek (JLAB)



Balint Joo (ORNL)



Alexander Jentsch (BNL)



Miguel Arratia (UCR)



Douglas Higinbotham (JLab)

THE SCHOOL SCHEDULE

- The school runs in person and on ZOOM.
- <https://stonybrook.zoom.us/j/92238671085?pwd=S09LNWZJLzhtd1I6c3pmcXRzRDNIUT09>
- Mute yourself upon entry, raise your hand if you have questions to the lecturer
- The program is posted on Indico: <https://indico.bnl.gov/event/15003/timetable/#20220711>