

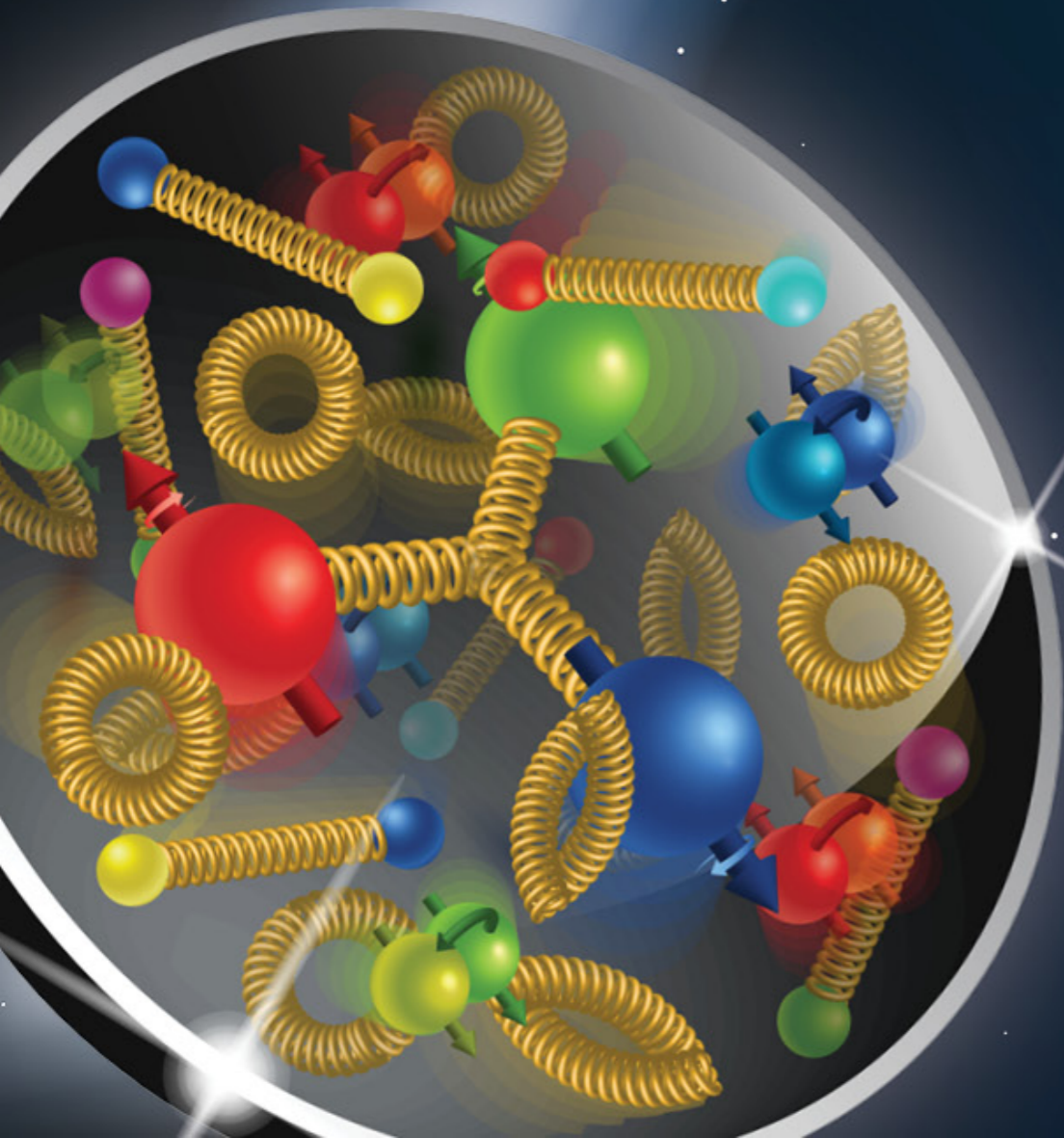
The 2021 CFNS

Summer

School

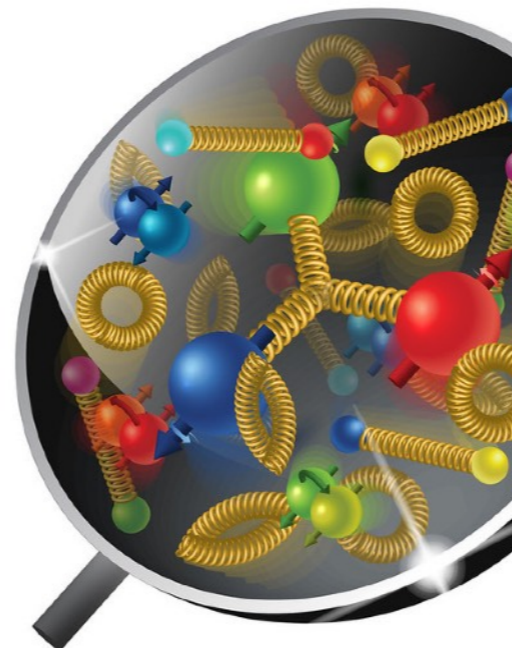
Alexei Prokudin

Pennsylvania State University Berks and Jefferson Lab



WELCOME TO THE 2021 CFNS SUMMER SCHOOL

Welcome to the 2021 CFNS Summer School dedicated to the physics of the Electron-Ion Collider



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

It is our second School, the

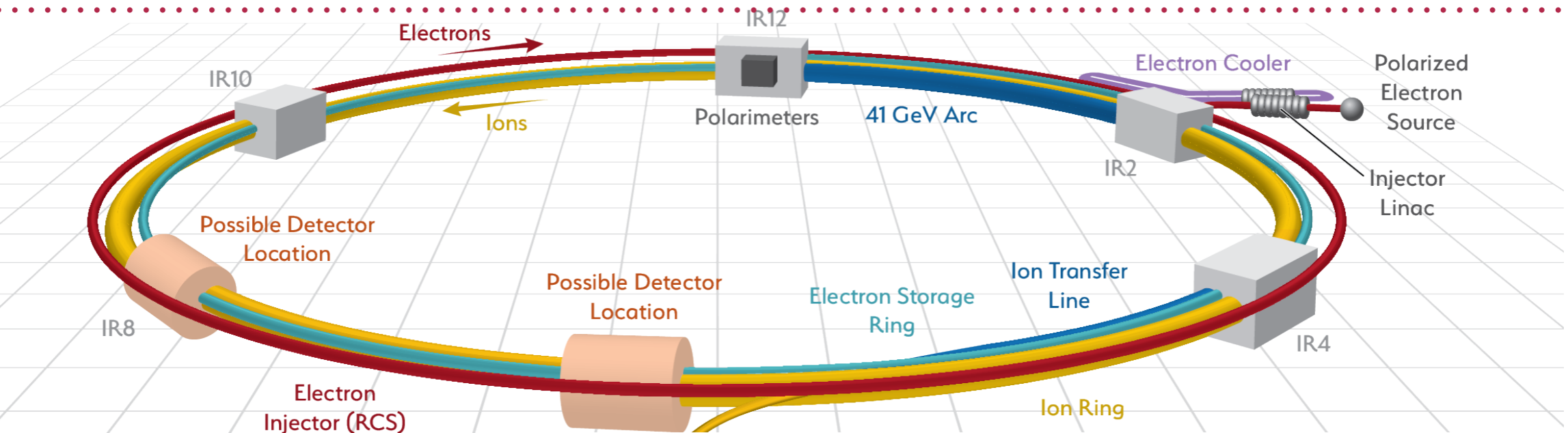


We have 63 students this year and we are looking forward to a very exciting time

THE SCHOOL ORGANIZERS

- Abhay Deshpande (SBU) Director
- Alexei Prokudin (PSU Berks and JLab) Chair
- Martha Constantinou (Temple)
- Socorro Delquaglio (SBU)
- Ciprian Gal (SBU)
- Sanghwa Park (SBU)
- Marlene Vera-Viteri (SBU)
- Jinlong Zhang (Shandong University)

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)

(Polarized)
Ion Source

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

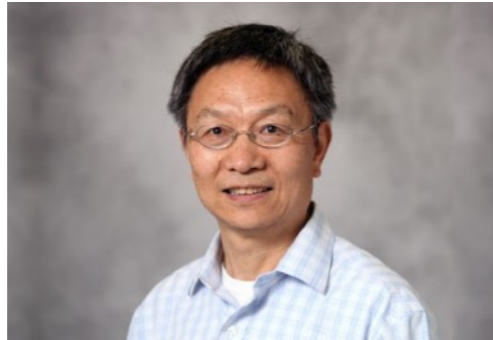
THE ELECTRON-ION COLLIDER: SCIENTIFIC QUESTIONS

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



Jianwei Qiu (JLab)



Olga Evdokimov (UIC)



Tuomas Lappi (JYU)



Renee Fatemi (UKY)



Xiangdong Ji (UMD)



Mei Bai (SLAC)

THE SCHOOL LECTURERS: SECOND WEEK



Cédric Lorcé (École polytechnique)



Dave Gaskell (JLAB)



Markus Diefenthaler (JLAB)



Joe Osborn (ORNL)



Sylvester Joosten (ANL)



Wouter Deconinck (University of Manitoba)

THE SCHOOL SCHEDULE

- The school runs on ZOOM: <https://stonybrook.zoom.us/j/99040334301?pwd=UGk2RzFPcy9zVERFNGxNNFB1cUZmQT09>
- Mute yourself upon entry, raise your hand if you have questions to the lecturer
- Social gatherings will be on gathertown: https://gather.town/app/GuK807f4PIhfb1b0/CFNS_SBU