

2nd Precision Studies on QCD @ Electron Ion Collider

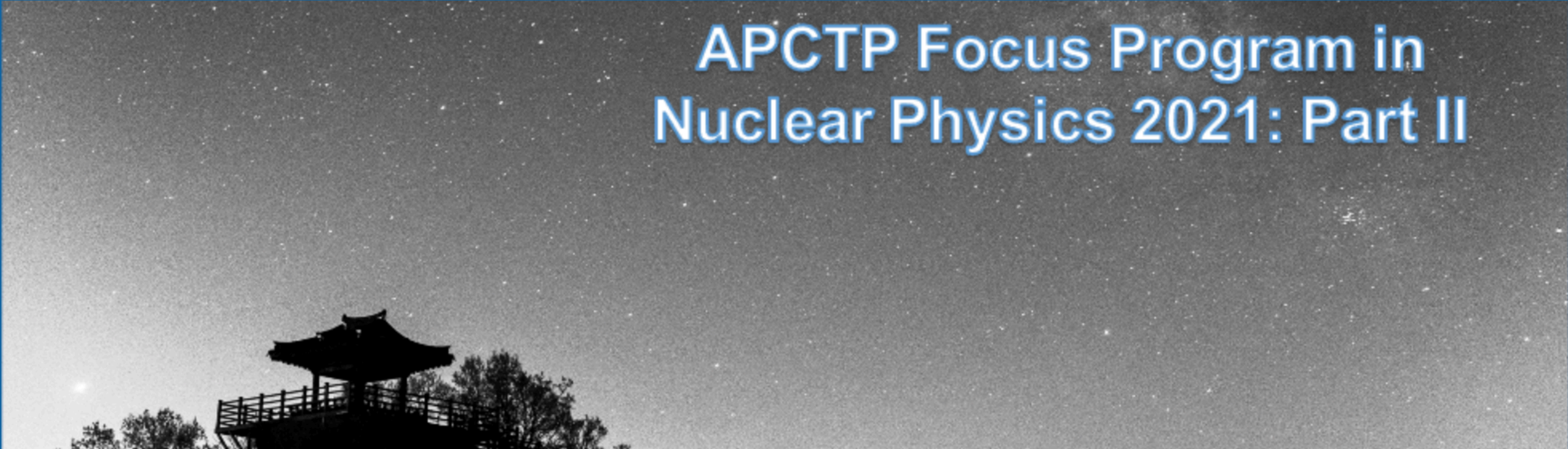
Report from the Companion Meeting

(APCTP Focus Program: Science Opportunities with QCD)

YONGSEOK OH

(KYUNGPOOK NATIONAL UNIVERSITY)

Companion Program



APCTP Focus Program in Nuclear Physics 2021: Part II

APCTP Focus Program in Nuclear Physics 2021 Part II: Science Opportunities with EIC

19-24 July 2021
Hilton Gyeongju
Asia/Seoul timezone

Overview
Timetable
Registration
Participant List
Remote Connection (via ZOOM)
Companion Meeting (The 2nd PSQ@EIC Meeting, 19-24 July, 2021)
APCTP Focus Program in NP 2021 Part I (14-16 July, 2021)
COVID-19 Social Distancing Policy (in Korean)

APCTP Focus Program in Nuclear Physics 2021 Part II: **Science Opportunities with EIC**

Onsite (for domestic) and Online Blended Meeting

19 - 24 July, 2021

Supported by APCTP and CHEP@KNU

<https://indico.knu.ac.kr/e/APCTP2021-NP2>

ZOOM Registration Link: https://zoom.us/meeting/register/tJAude2gqz0rH9Y-ftX1TT_JEINqRPI9OZNF

Gyeongju Hilton, Cherry Room (B1)

It is well known that charged leptons are ideal probes to investigate the internal structure of hadrons and nuclei. In fact, many cutting-edge accelerator facilities have been constructed for this purpose and still many world- leading facilities are leading the research in this area. These investigations

60 registrants
(cf. PSQ@EIC 198 registrants)

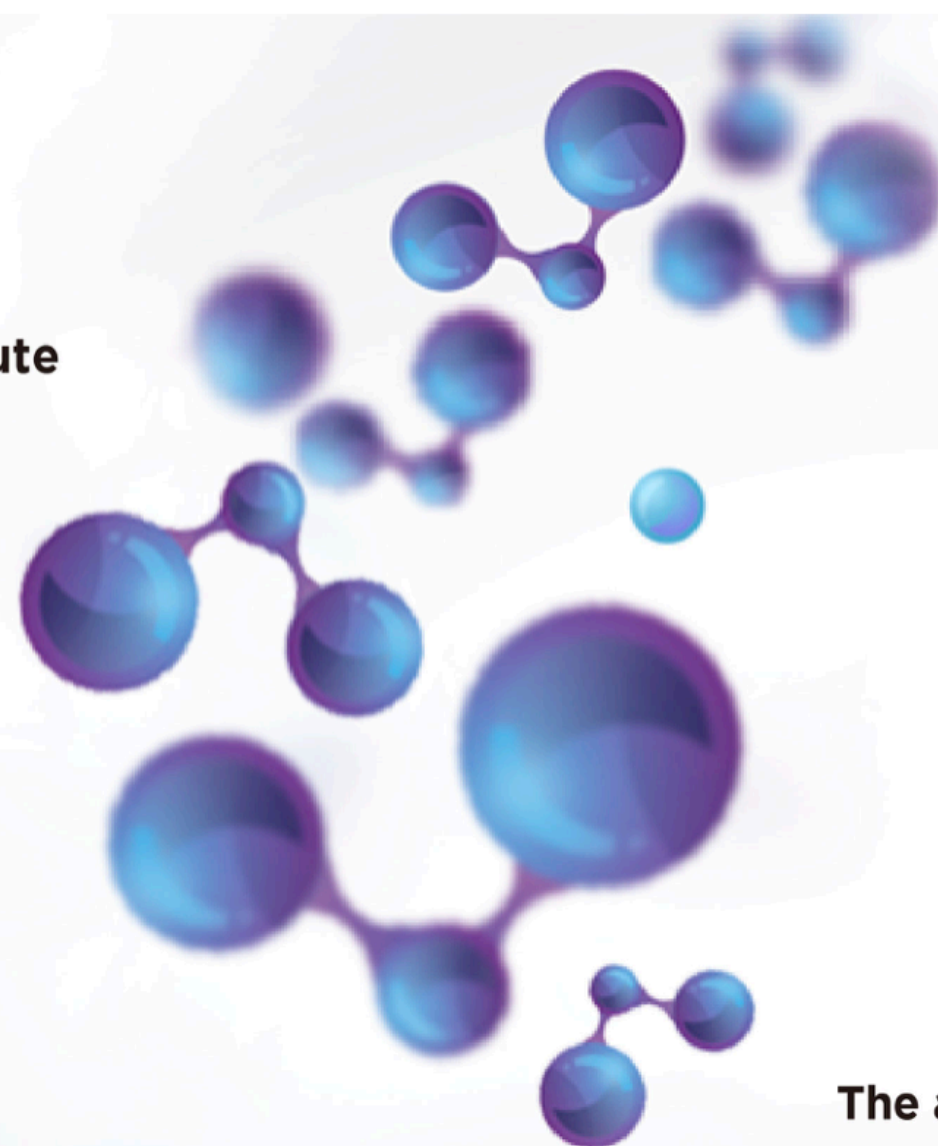
APCTP (Asia Pacific Center for Theoretical Physics)



APCTP Activities Research Asia Pacific Network

Prof. Hiroshi Ooguri

Fred Kavli Professor,
Director of Walter Burke Institute
for Theoretical Physics,
California Institute of
Technology;
Director of Kavli IPMU,
the University of Tokyo



2021 BENJAMIN W. LEE PROFESSORSHIP

Professor Hiroshi Ooguri receives the 2021 Benjamin Lee Professorship Award of the Asian-Pacific Center for Theoretical Physics (APCTP). Professor Ooguri has made fundamental contributions to superstring theory, quantum black holes, supersymmetric gauge theories, and related mathematical physics. The awarding ceremony will be held at the KPS fall meeting in October 2021.



Research



People



Upcoming Academic
Events



Job Opportunities at
APCTP



Call for Program
& Visitor Application



Outreach Programs



Visitor Information



Calendar

APCTP - Nuclear & Hadron Physics

Mini-workshops (2–4 times per year)

- relativistic heavy ion physics
- hadron/nuclear physics

International Joint workshops

- Joint Institute for Nuclear Research, Dubna, Russia (since 2007)
- TRIUMF (since 2018)
- Partnership: ECT*, RCNP, INP (Nanjing Univ.)

Nuclear Physics School (since 2001)

APCTP Focus Program

Nuclear Physics Program (Starting 2019)

APCTP Focus Program in Nuclear Physics 2019

Nuclear many-body theories: beyond the mean field approaches

July 01 (Mon), 2019 ~ July 10 (Wed), 2019

Main Page

Registration/Participants

Program

Accommodation

Travel Information

Poster/Photo

Talk/Lecture file

Main Page

APCTP Focus Program in Nuclear Physics 2019

Venue

APCTP Headquarters, Pohang

Period

July 01 (Mon), 2019 ~ July 10 (Wed), 2019

Overview

Nuclear many-body theory is a major key to understand the structure of nucleus and nuclear matter. It has a key role in investigating the structure of compact stellar objects like neutron stars. In most cases, the mean field approximation is widely used as the first approximation to the strongly interacting nuclear systems. However, for more profound understanding of nuclear matter requires theoretical tools beyond the mean field treatment. Therefore, investigation in this direction is very crucial to develop more powerful and consistent theory for nuclear structure and nuclear matter. In this Focus Program, we will summarize the attempts made up to present and discuss the directions of future research. To establish close collaboration among participants is another goal of this program. We will start by addressing the topic of nuclear nuclear correlations in nuclear resonance theory and

Invited Speakers

- A. N. Antonov (BAS, Bulgaria)
- J. W. Clark (Washington Univ., St. Louis, USA)
- H. Feldmeier (GSI, Germany)
- M. Grasso (IPN Orsay, France)
- J. W. Holt (Texas A&M Univ., USA)
- Y. Kim (IBS, Korea)
- E. Krotscheck (SUNY Buffalo, USA)
- C.-H. Lee (Pusan National Univ., Korea)
- Y. Lim (Texas A&M Univ., USA; TU Darmstadt, Germany)
- E. Litvinova (Western Michigan Univ., USA)
- J. Meng (Peking Univ., China)
- P. Papakonstantinou (IBS, Korea)
- C. Robin (INT, Univ. Washington, USA)
- M. Tohyama (Kyorin Univ., Japan)
- K. Tsushima (Univ. Cruzeiro do Sul)

APCTP Focus Program

Nuclear Physics Program (2020)

APCTP Focus Program in Nuclear Physics 2020 Electroweak scatterings with nuclear targets July 06 (Mon), 2020 ~ July 11 (Sat), 2020

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Program

Accommodation

Travel Information

Poster/Photo

Talk/Lecture file

■ Main Page

Venue

[APCTP Pohang Headquarters](#)

Period

July 06 (Mon), 2020 ~ July 11 (Sat), 2020

Announcement

Because of the pandemic due to COVID-19, we conclude that the focus program should be postponed to next year. The new dates and venue will be announced later and we will contact you again when the new schedule is fixed. Health of participants is our main concern and we hope that you understand our decision.

2nd PSQ@EIC Meeting

2nd PSQ@EIC Meeting: Precision Studies on QCD at EIC

19-23 July 2021

Online

Asia/Seoul timezone

Overview

Call for Abstracts

Timetable

Registration

Participant List

1st Circular

Remote Connection (via
ZOOM)

Organizing Committee

Sponsors

Companion Meeting
(APCTP Focus Program for

2nd PSQ@EIC Meeting: Precision Studies on QCD at EIC

APCTP-CFNS Joint Meeting (Online)

19-23 July, 2021

Supported by APCTP, CHEP@KNU, CFNS

<https://indico.bnl.gov/e/PSQ-WS2>

ZOOM Registration Link: https://zoom.us/meeting/register/tJAude2gqz0rH9Y-ftX1TT_JEINqRPi9OZNF

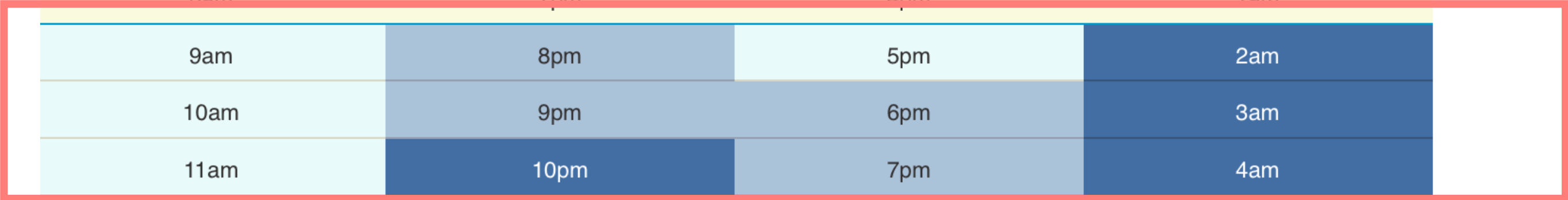
Timezone Converter: <https://savvytime.com>

Seoul, South Korea	New York City, NY, USA	Los Angeles, CA, USA	Paris, France
12am (midnight)	11am	8am	5pm
1am	12pm (noon)	9am	6pm
2am	1pm	10am	7pm
3am	2pm	11am	8pm
4am	3pm	12pm (noon)	9pm
5am	4pm	1pm	10pm
6am	5pm	2pm	11pm
7am	6pm	3pm	12am (midnight)
8am	7pm	4pm	1am
9am	8pm	5pm	2am
10am	9pm	6pm	3am
11am	10pm	7pm	4am
12pm (noon)	11pm	8pm	5am
1pm	12am (midnight)	9pm	6am
2pm	1am	10pm	7am
3pm	2am	11pm	8am
4pm	3am	12am (midnight)	9am
5pm	4am	1am	10am
6pm	5am	2am	11am
7pm	6am	3am	12pm (noon)
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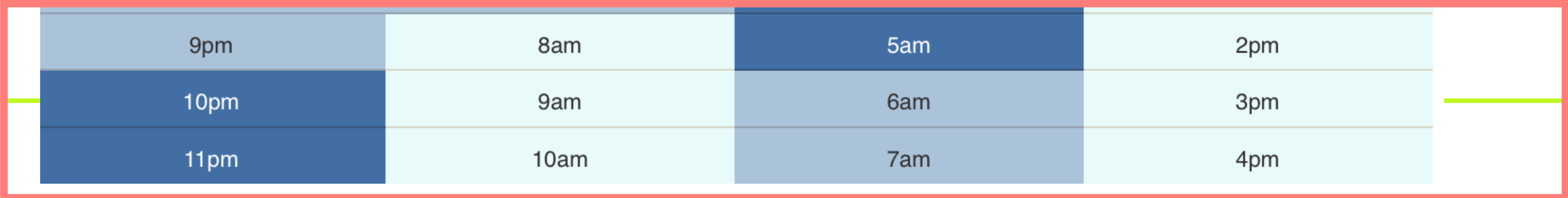
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PSQ@EIC



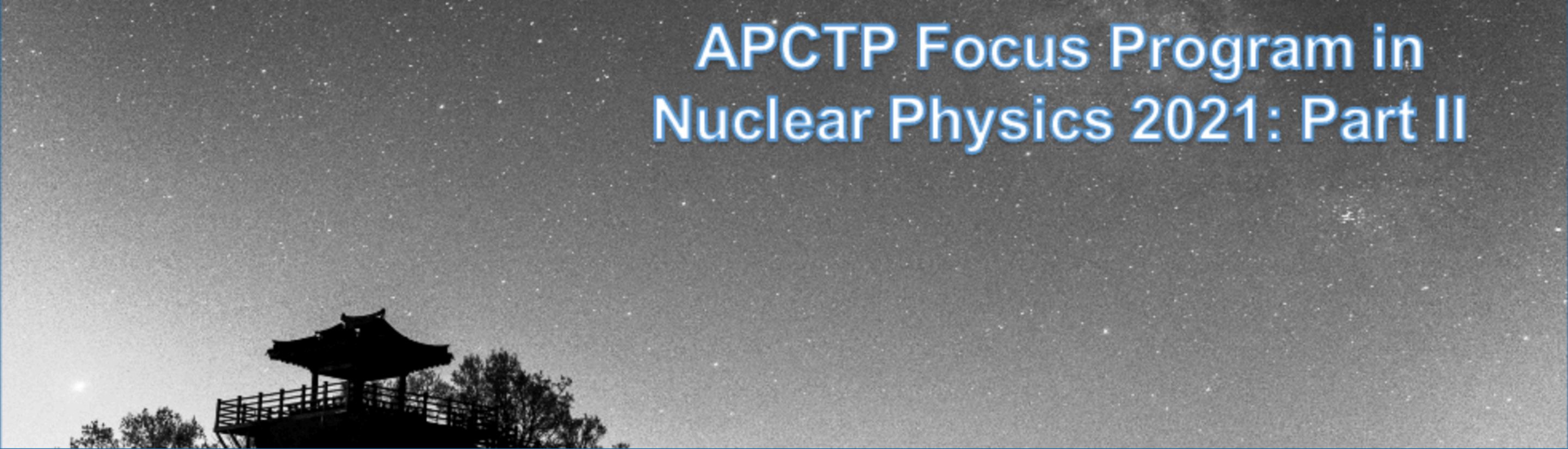
APCTP FP



PSQ@EIC



APCTP Focus Program (15 talks/5 days)



APCTP Focus Program in Nuclear Physics 2021: Part II

APCTP Focus Program in Nuclear Physics 2021 Part II: Science Opportunities with EIC

19-24 July 2021
Hilton Gyeongju
Asia/Seoul timezone

Hybrid Meeting

On-site: 20 participants

Others through online

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19 - 24 July, 2021

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<https://indico.knu.ac.kr/e/APCTP2021-NP2>

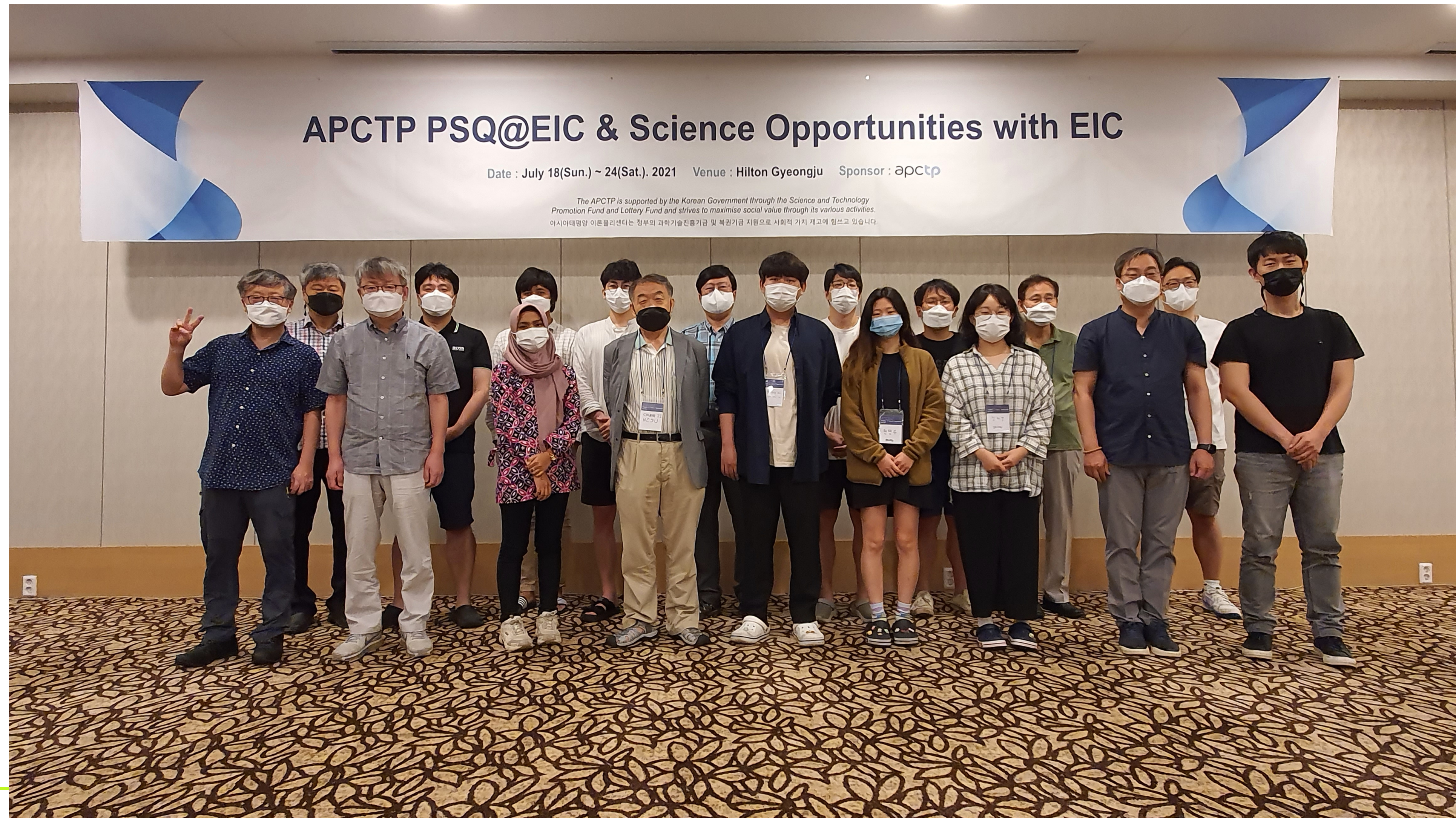
ZOOM Registration Link: https://zoom.us/meeting/register/tJAude2gqz0rH9Y-ftX1TT_JEINqRPI9OZNF

Gyeongju Hilton, Cherry Room (B1)

APCTP Focus Program



APCTP Focus Program



APCTP Focus Program (Monday)

MONDAY, 19 JULY			
13:55 → 16:15	Focus Program: Session A		
	Convener: Yongseok Oh (Kyungpook National University)		
13:55	Welcome Remarks Speaker: Chueng-Ryong Ji (North Carolina State University)	🕒 5m	
14:00	Delta baryon photoproduction with twisted photons Speaker: Carl Carlson (William & Mary) Carlson_APCTP_20...	🕒 40m	
14:40	Gravitational form factors and mechanical properties of hadrons Speaker: Maxim Polyakov (Ruhr-University Bochum) Polyakov_Mechani...	🕒 40m	
15:20	Break	🕒 15m	
15:35	Generalized parton distributions from experiments Speaker: Hervé Moutarde (Irfu, CEA) moutarde-apctp-qc...	🕒 40m	
21:00 → 00:00	PSQ@EIC: https://indico.bnl.gov/e/PSQ-WS2 (Session 1, 2)		

Delta baryon photoproduction with twisted photons

Carl E. Carlson
William & Mary

APCTP Focus Program in Nuclear Physics 2021
19-24 July 2021, Gyeongju, Korea

Crim Dell



Bunhwangsa pagoda



Talk based on work with Andrei Afanasev
plus related work with Asmita Mukherjee,
Maria Solyanik-Gorgone, Christian
Schmiegelow, Ferdinand Kaler-Schmidt, Jonas
Schulz, Hao Wang

Mechanical properties of particles

M.V. Polyakov

Ruhr-University Bochum & Petersburg NPI

- Interaction of the nucleon with gravity, gravitational ffs
- Three fundamental gravitational “charges”:
mass, spin & D (related to shear and pressure, *Druck-term*)
- Effective chiral theory in presence of gravity
- Normal and tangential forces inside large N_c nucleon.
Stability conditions.
- First experimental results on gravitational form factors
- Forces between quark and gluon subsystems inside the nucleon
- Conclusion and outlook.

based on:

MVP, PLB555 (2003)

HD Son, MVP, JHEP09 (2018)

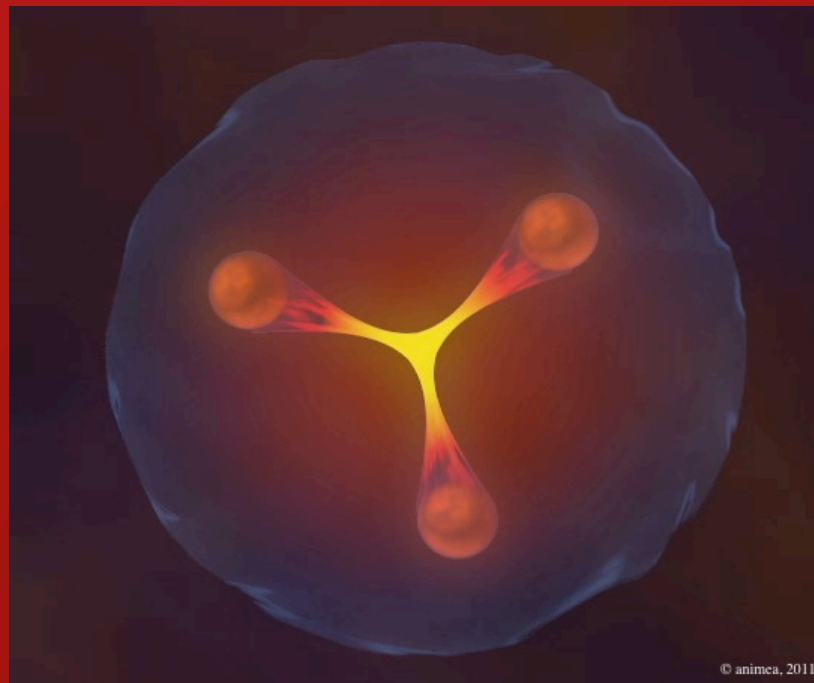
Alharazin, Djukanovic, Gegelia, MVP, PRD102 (2020)

Panteleeva, MVP, 2102.10902

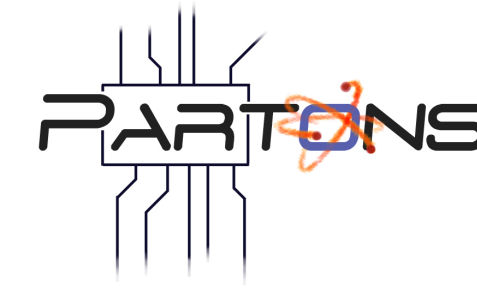
for a review see: P. Schweitzer, MVP 1805.06596

DE LA RECHERCHE À L'INDUSTRIE

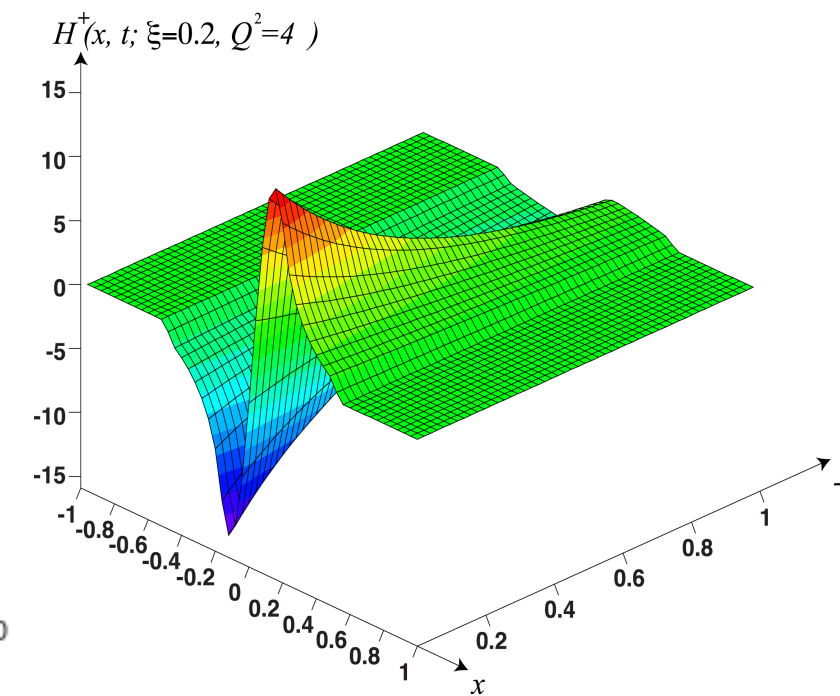
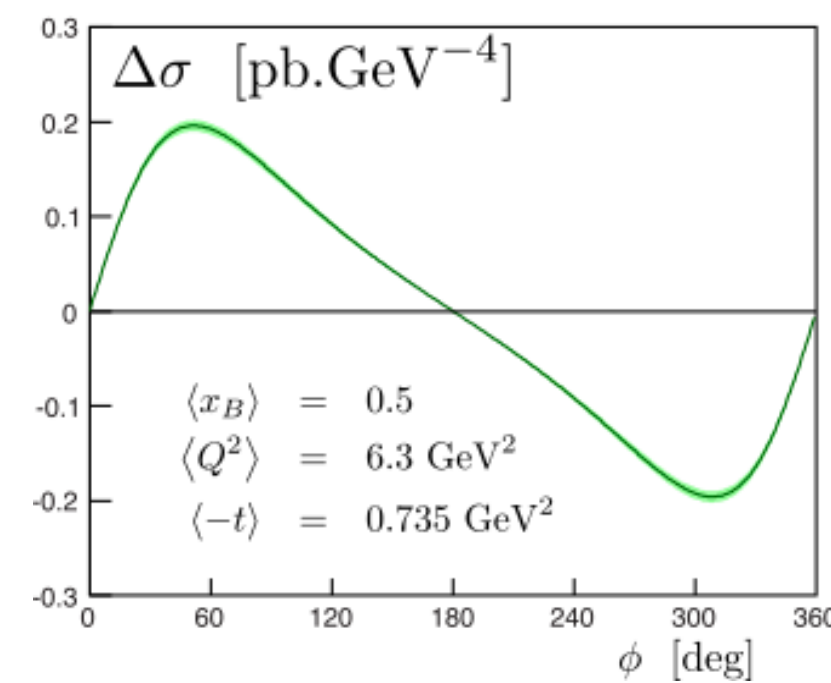
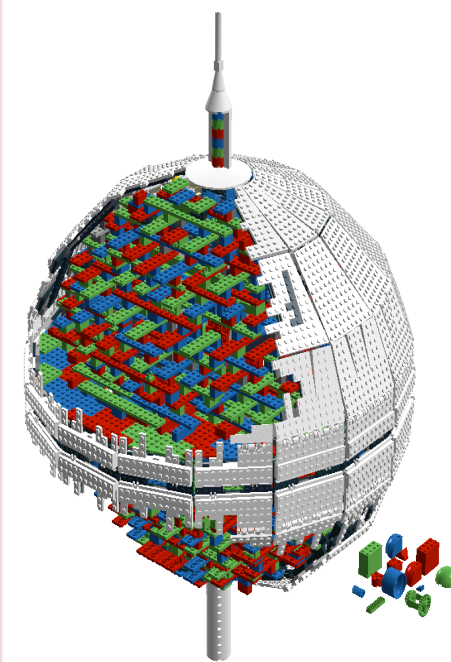
cea



www.cea.fr



Generalized parton distributions from experiments



Science Opportunities with EIC | Hervé MOUTARDE

Jul. 19, 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824093.

université
PARIS-SACLAY

APCTP Focus Program (Tuesday)

TUESDAY, 20 JULY



09:00 → 10:45 PSQ@EIC: <https://indico.bnl.gov/e/PSQ-WS2> (Session 3)



14:00 → 16:15 Focus Program: Session B



Convener: Hyun-Chul Kim (Inha University)

14:00 **Simplicity and complexity in the light-front vacuum**

⌚ 40m



Speaker: John Hiller (University of Idaho)

[hiller-apctp2021.pdf](#)

14:40 **Proton mass decomposition**

⌚ 40m



Speaker: Cédric Lorcé (Ecole Polytechnique)

[Nucleon mass dec...](#)

15:20 **Break**

⌚ 15m

15:35 **Hadron physics program at J-PARC**

⌚ 40m



Speaker: Shinya Sawada (KEK)

[J-PARC-Sawada.pdf](#)

21:00 → 00:00 PSQ@EIC: <https://indico.bnl.gov/e/PSQ-WS2> (Session 4, 5)





Simplicity and complexity in the light-front vacuum

Work done in collaboration with S.S. Chabysheva.

*Supported in part by the Minnesota Supercomputing Institute and
the IBEST Computational Resources Core at the University of Idaho.*

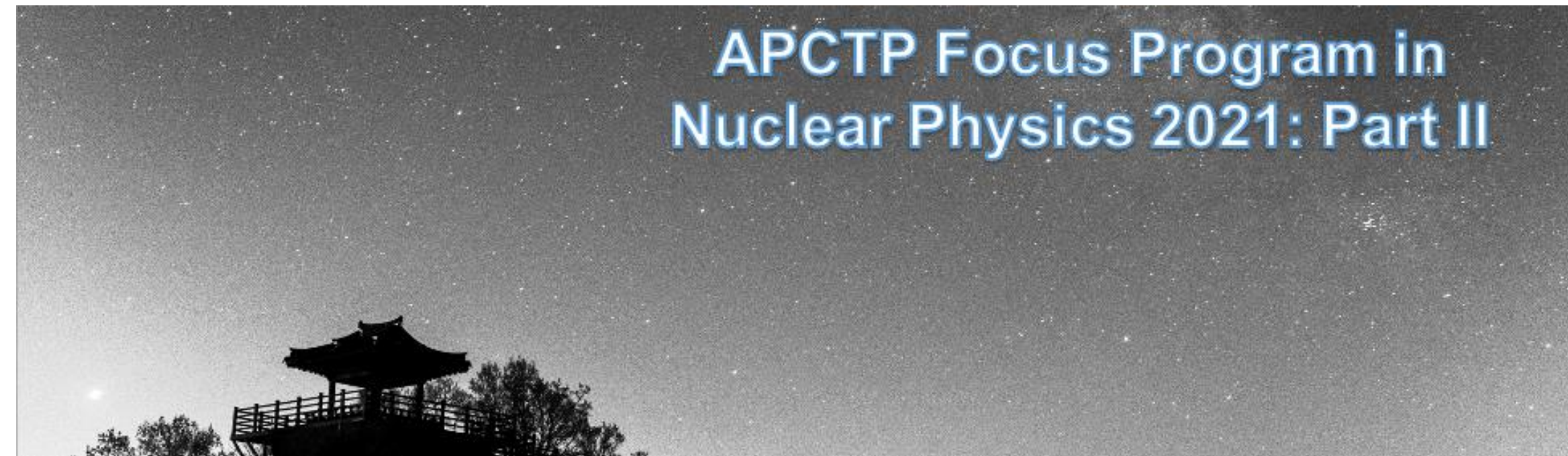
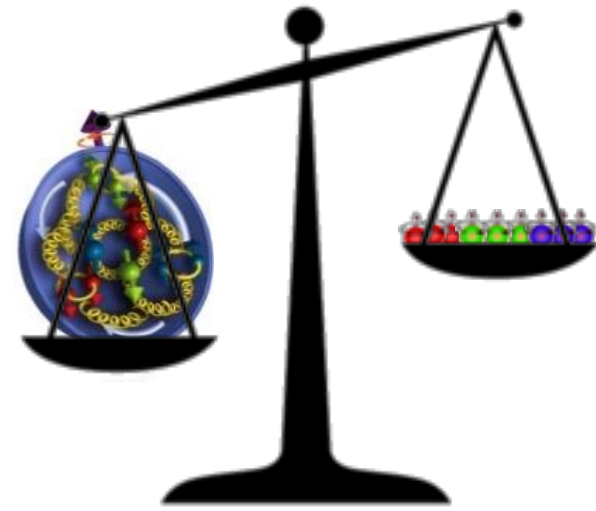
John R. Hiller

`jhill@uidaho.edu`

Department of Physics

University of Idaho





APCTP Focus Program in
Nuclear Physics 2021: Part II

Proton mass decomposition

Cédric Lorcé



July 20, Hilton Gyeongju, Korea

Hadronic Physics Program at J-PARC

APCTP Focus Program in Nuclear Physics 2021 Part II

Science Opportunities with EIC

July 20, 2021

Shinya Sawada (KEK/J-PARC)

KEK50 年



KEK 2021

APCTP Focus Program (Wednesday)

WEDNESDAY, 21 JULY



09:00 → 11:00 PSQ@EIC: <https://indico.bnl.gov/e/PSQ-WS2> (Session 6)



14:00 → 15:55 Focus Program: Session C
Convener: Kyungseon Joo (University of Connecticut)



14:00 Emergence of hadron mass from the experimental results on hadron structure
Speaker: Victor Mokeev (JLAB)

⌚ 40m



EIC_APCTP_mokee...

14:40 Break ⌚ 15m

14:55 Space-like and Time-like Form Factors in Nucleon Resonance Production I
Speaker: Beatrice Ramstein (IPN, Orsay)

⌚ 30m



15:25 Space-like and Time-like Form Factors in Nucleon Resonance Production II
Speaker: Philip Cole (Lamar University)

⌚ 30m



APCTP-Workshop_...

21:00 → 00:00 PSQ@EIC: <https://indico.bnl.gov/e/PSQ-WS2> (Session 7, 8)



Emergence of Hadron Mass (EHM) from the Experimental Results on Hadron Structure

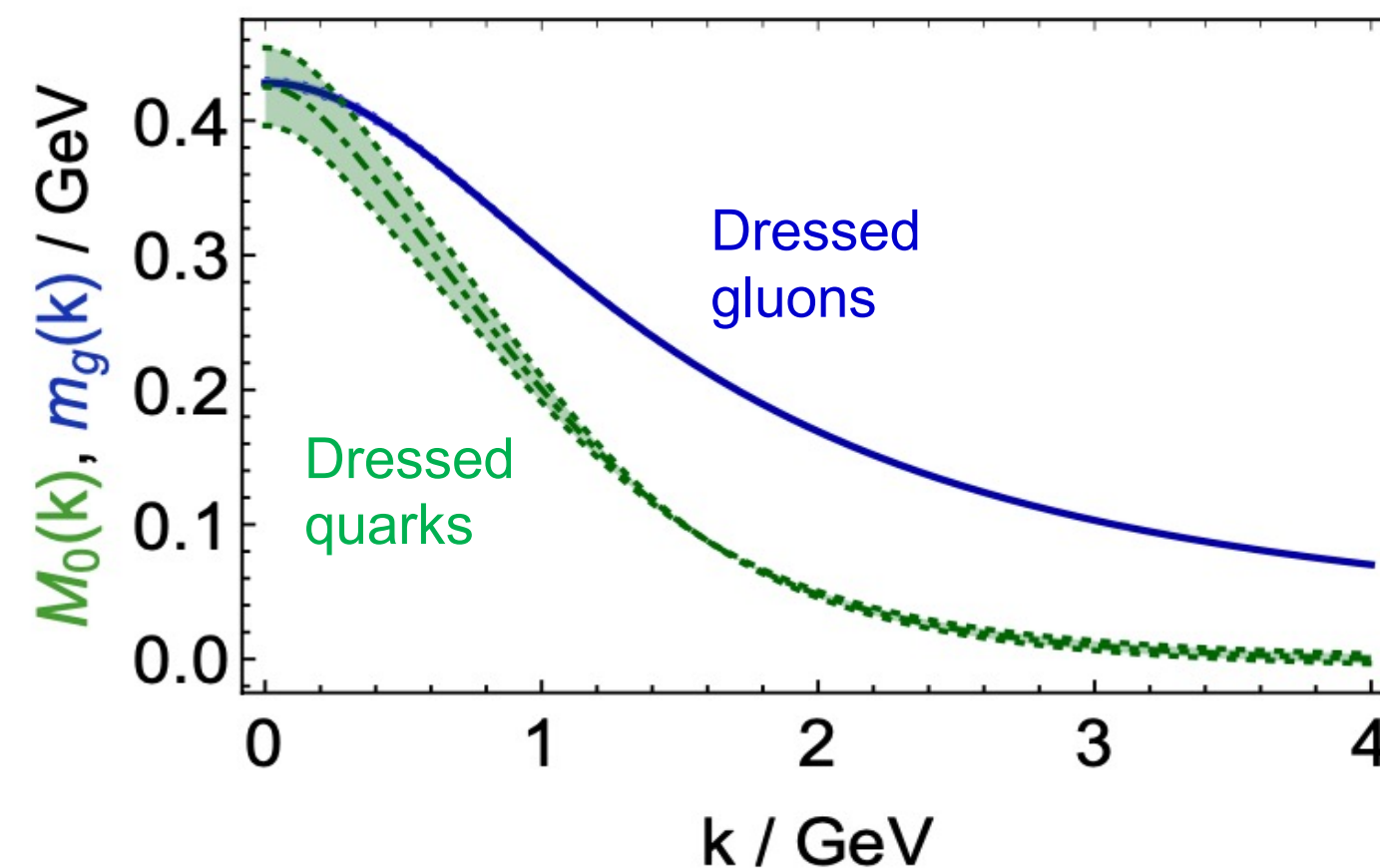
APCTP Focus Program in
Nuclear Physics 2021: Part II

APCTP Focus Program in Nuclear Physics 2021 Part II: Science
Opportunities with EIC

V.I. Mokeev, Jefferson
Laboratory, for the CLAS
Collaboration

Talk outline:

- Connecting EHM to the hadron structure observables
- EHM from the data on pseudo-scalar meson structure
- EHM from studies of the ground and excited state nucleon structure
- Prospects with increased energy and luminosity



Space-like and Time-like Form Factors in Nucleon Resonance Production II

APCTP Focus Program in Nuclear Physics 2021: Part II

APCTP Focus Program in Nuclear Physics 2021 Part II: Science
Opportunities with EIC

Asia Pacific Center for Theoretical Physics

apctp asia pacific center for
theoretical physics



- PHY-1615146
- PHY-2012826

 **FULBRIGHT**
Association

Philip Cole
Lamar University



July 21, 2021

APCTP Focus Program (Thursday)

THURSDAY, 22 JULY



09:00 → 11:10 PSQ@EIC: <https://indico.bnl.gov/e/PSQ-WS2> (Session 9)



14:00 → 16:15 Focus Program: Session D



Convener: Seung-Il Nam (Pukyong National University)

14:00

Three-dimensional structure of the nucleon and the opportunities of the EIC

⌚ 40m



Speaker: Alexei Prokudin (Penn State Univ. Berks and Jefferson Lab)

Prokudin_APCTP2...

14:40

Interpolating instant form dynamics and light-front dynamics

⌚ 40m



Speaker: Chueng-Ryong Ji (North Carolina State University)

Interpolating instan...

15:20

Break

⌚ 15m

15:35

The saga of proton sea asymmetry

⌚ 40m



Speaker: Wen-Chen Chang (Institute of Physics, Academia Sinica)

20210722_SeaQue...

21:00 → 00:00 PSQ@EIC: <https://indico.bnl.gov/e/PSQ-WS2> (Session 10, 11)





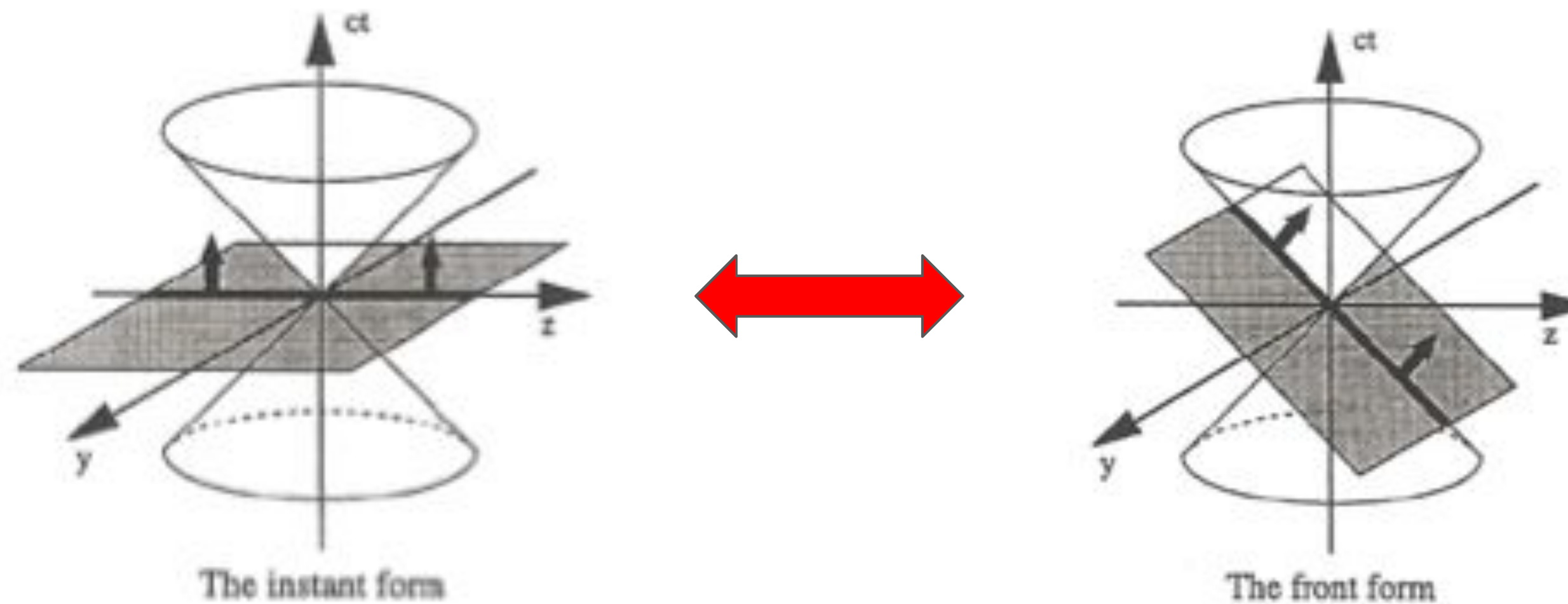
Three-dimensional structure of the nucleon and the EIC

Alexei Prokudin

Interpolating instant form dynamics and light-front dynamics

Chueng-Ryong Ji

North Carolina State University



APCTP Focus Program in NP2021 Part II

July 22, 2021

APCTP Focus Program in Nuclear Physics 2021: Part II

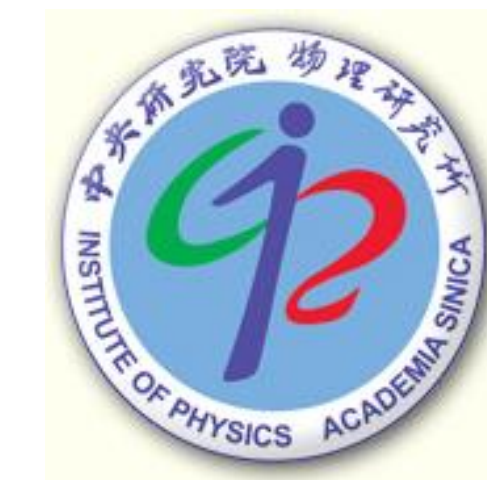
July 22, 2021



The saga of proton sea asymmetry



Wen-Chen Chang 章文箴
Institute of Physics, Academia Sinica



APCTP Focus Program (Friday)

FRIDAY, 23 JULY



14:00 → 16:15 **Focus Program: Session E**



Convener: Ho-Meoyng Choi (Kyungpook National University)

14:00

K-long beam experiment at Jefferson Lab

Speaker: Igor Strakovsky (The George Washington University)

⌚ 40m



14:40

Hyperon-proton scattering experiment at J-PARC for better understanding of hyperon-nucleon interaction

Speaker: Koji Miwa (Tohoku University)

⌚ 40m



15:20

Break

⌚ 15m

15:35

Production of XYZ states

Speaker: Alessandro Pilloni (Università di Messina)

⌚ 40m



21:00 → 00:00 **PSQ@EIC: <https://indico.bnl.gov/e/PSQ-WS2> (Session 12, 13)**



K-Long Beam Experiment at Jefferson Lab

*Igor Strakovsky**
The George Washington University
(for *KLF* Collaboration)



7/21/2021

APCTP-2021, Gyeong Ju, South Korea, July 2021

arXiv:2008.08215 [nucl-ex]

* Supported by



DE-SC0016583

Igor Strakovsky 1



Hyperon-proton scattering experiment at J-PARC for better understanding of hyperon-nucleon interaction

APCTP Focus Program in NP2021 Part II, July 23, 2021

Koji Miwa (Tohoku univ.)



Production of XYZ

Alessandro Pilloni

APCTP Focus Program, July 23rd, 2021



Università
degli Studi di
Messina

2nd PSQ@EIC Meeting

2nd PSQ@EIC Meeting: Precision Studies on QCD at EIC

19-23 July 2021

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1st PSQ@EIC Meeting
(17-19 March, 2021)

2nd PSQ@EIC Meeting: Precision Studies on QCD at EIC

APCTP-CFNS Joint Meeting (Online)

19-23 July, 2021

Supported by APCTP, CHEP@KNU, CFNS

<https://indico.bnl.gov/e/PSQ-WS2>

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Timezone Converter: <https://savvytime.com>

(2nd circular)

The **second PSQ@EIC meeting**, co-hosted by Asia Pacific Center for Theoretical Physics (APCTP) and

A banner image for the Light Cone 2021 conference. It features a night view of a coastline with a large, dark, flat-topped mountain (Hallasan) in the background. The sky is dark blue, and the water in the foreground is calm, reflecting the lights from the city and the mountain. The text 'Light Cone 2021' is written in a bold, yellow, sans-serif font in the upper right corner. Below it, 'Jeju Island, Korea' is written in a yellow, cursive script font.

Light Cone 2021

Jeju Island, Korea

Light Cone 2021: Physics of Hadrons on the Light Front

29 November 2021 to 4 December 2021
Jeju Boooyoung Hotel
Asia/Seoul timezone



29 Nov - 4 Dec.

In-person meeting

Overview

Scientific Programme

Call for Abstracts

Timetable

Registration

Participant List

Conference Venue

Committees

Sponsors

<http://indico.cern.ch/e/LC2021>

Welcome to LC 2021!

Because of the covid-19 pandemic, LC 2020 was moved to LC 2021.

Light Cone 2021 is the latest in the series of conferences that, beginning in 1991, have played an important role in promoting research towards a rigorous description of hadrons and nuclei based on quantisation methods in the front form.

As with earlier conferences in the series, the aim of this meeting will be to create a scientific program that will stimulate developments at the forefront of nuclear, hadron and particle physics research. In particular, Light Cone 2021 will focus on the following physics topics and approaches:

Thank You



See you at Jeju