Correlations in Partonic and Hadronic Interactions 2020 (CPHI-2020)

The European Organization for Nuclear Research (CERN),
Geneva, Switzerland, 3-7 February, 2020

Final circular

The Science Motivation

The understanding of the structure of hadrons and nuclei, and in particular of spatial and transverse momentum dependent distributions of partons (3D PDFs), are key questions of the modern nuclear physics. The knowledge of 3D partonic structure of nucleons and nuclei is crucial for studies in ℓN, e^+e^-, and hadron-hadron colliders (even at the LHC energies).

Recently, significant disagreements have been reported in comparison of theoretical predictions, based on combination of TMD factorization and collinear factorization and experimental measurements for various transverse momentum distributions of hadrons in lepton-nucleon, electron-positron, and dileptons in DY process. Those observations emerge into a new crisis, the "qT -crisis". Correlations in partonic and hadronic interactions, which may be responsible for observed disagreements, provide important information on underlying dynamics, manifesting themselves in variety of observables widely recognized as key objectives of the forthcoming COMPASS (CERN) polarized deuteron run in 2021, JLab 12 GeV upgrade and a driving force behind construction of the Electron Ion Collider (EIC).

The workshop will focus on the steps needed for development of theory and phenomenology involved in the extraction of TMDs and GPDs from existing and future data from lepton-nucleon, electron-positron and hadron-hadron facilities at BNL, CERN, DESY, FNAL, JLab, and KEK, with controlled systematics over various assumptions involved in the process.

Workshop Information

Dates and Venue

The week-long workshop on Correlations in partonic and hadronic interactions (CPHI-2020) will take place at CERN in Geneva, Switzerland, from February 3rd to 7th, 2020. Further practical information can be obtained from the workshop Indico-page:
https://indico.cern.ch/e/CPHI-2020.

An attendance of about 80-90 participants is expected.

Registration

The deadline for registration is February 2nd, 2020. The registration form is available from the workshop web page, where details for payments are also given:
https://indico.cern.ch/event/854338/registrations/55365/.

CERN visitor cards have been issued for all participants (except CERN-users with access right). Participants received an e-mail containing a reservation code and a visitor card, which

should be printed in A4 format and then folded into four to obtain an A6 format. If the e-mail is lost, you can always get your visitor card from the registration page: https://indico.cern.ch/event/854338/registrations/55365/ and click on the "Get ticket" button. Participants must be able to show at any moment on CERN territory their visitor cards, along with a valid identity document, to the security guard on duty. Note that the accompanying persons wishing to access CERN-site should also register in order to obtain a visitor card.

Accommodation

Participants should take care of their own accommodation. We have reserved hotel rooms at discounted rates for workshop participants in some hotels located near the CERN; please quote "CPHI2020-CERN" keyword in the reservation. Further details are available at the workshop web page:
https://indico.cern.ch/event/854338/page/19204-accomodation

Social Programme

The social program will include a welcome reception on Monday evening, Tuesday drink and a workshop dinner on Thursday evening. More information will be given at the workshop web page: https://indico.cern.ch/event/854338/page/19288-social-programme.

Transportation

Some guidelines how to arrive to CERN and hotels as well as information about CERN shuttle service is provided at the workshop Indico page:
https://indico.cern.ch/event/854338/page/19261-transportation.

Transportation from CERN Globe parking and Ibis hotel area to the workshop site will be provided. Further information is available at the workshop web page.

Please consult the workshop site for further details on visa information and network access at CERN.

Scientific programme

The scientific program will consist of 65 plenary talks (by invitation only). The duration of the talks is fixed to 25 minutes (including questions). The agenda is available at the workshop web page https://indico.cern.ch/event/854338/timetable/#20200203.detailed.

Abstract submissions are managed by the CERN-Indico system. All speakers are kindly asked to submit a short abstract: https://indico.cern.ch/event/854338/abstracts/.

The workshop coincides with Stan Brodsky's 80-th and Aram Kotzinian's 70-th birthdays. Two separate sessions will be organized on Tuesday (AKM-70 session) and on Thursday (SJB-80 session) to give credit to their important scientific contributions to the field of TMDs and beyond during their long careers.

The following list represents several current key questions of nuclear structure to be addressed at the workshop.

1) Transverse Structure of the nucleon and QCD issues associated with the 3D structure

- **Factorization issues in hadron production.**
- **Study of the QCD evolution properties of 3D PDFs.**
- **Evolution of TMDs and fits to physical cross sections.**
- **3D PDFs from Lattice QCD.**
- **New insights on 3D PDFs from non-perturbative models.**
- **Radiative corrections to hard scattering in exclusive and semi-inclusive processes.**

2) Measurements and global analysis of 3D PDFs

- **Phenomenology of 3D parton distribution and fragmentation functions.**
- **Leptoproduction with fixed target facilities at CERN, JLab and EIC.**
- **Measurements from hadron-hadron colliders and e^+e^- facilities.**
- **Drell-Yan lepton pair production and Drell-Yan plus jets.**
- **MC generators for global analysis of 3D PDFs.**
- **Validation of extraction frameworks, extraction of 3D PDFs.**

3) Partonic Structure beyond Densities

- **Generalized Transverse Momentum Distributions and their relations with GPDs and TMDs.**
- **Target fragmentation and conditional probabilities**
- **Higher twist asymmetries in hard scattering processes.**
- **Soft particle production and multi-parton interactions.**
- **"Proton radius puzzle" from electron-proton and muon-proton scattering experiments**

4) QCD in the Nuclear Environment

- **Medium modifications of TMDs and GPDs**
- **PDF medium modifications and short-range nucleon correlations**
- **Flavor dependence of medium modification effects**
- **Nuclear partonic distributions including x>1 region**
- **Tagged SIDIS processes off nuclear targets**
- **Hadronization processes in Nuclear SIDIS**
- **Hard nuclear QCD processes and Color transparency**

Supporting Institutions

The Workshop CPHI-2020 is supported by CERN (COMPASS experiment), Jefferson Laboratory (JLab), ANL (Argonne, IL) and INFN, in collaboration with colleagues from the University and INFN Section of Trieste, Freiburg University, LIP (Lisbon), Basque Country University and IKERBASQUE and New Mexico State University.

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