

# Fifth workshop on "Perceiving the Emergence of Hadron Mass through AMBER@CERN" (EHM2021/9)

Wednesday, 21 April 2021 - Friday, 30 April 2021

Perceiving the Emergence  
of Hadron Mass through

**AMBER@CERN**

27 April to 30 April 2021  
CERN, Geneva - Switzerland



## Book of Abstracts



# Contents

Introductory talk . . . . .	1
Probing EHM with AMBER . . . . .	1
Charged proton-radius measurement . . . . .	1
Antiproton cross-section measurements for Dark Matter search . . . . .	1
Probing the pion's parton structure at AMBER . . . . .	1
Probing the kaon's parton structure at AMBER Phase-2 . . . . .	1
Measuring excitation spectra in $K \pi \pi$ final states with AMBER Phase-2 . . . . .	1
Measuring the Primakoff reaction and $F_{\{K2\pi\}}$ with AMBER phase-II . . . . .	2
Can AMBER Phase-2 access the charge radius of pion or/and kaon? . . . . .	2
Can AMBER Phase-2 access Moments of pion/kaon Distribution Amplitudes in Diffractive Scattering? . . . . .	2
Lattice QCD for AMBER . . . . .	2
Meson DFs from Lattice QCD . . . . .	2
Pion DAs in AMBER . . . . .	2
EHM via Meson GPDs . . . . .	3
Basic EHM from Lattice QCD . . . . .	3
Pion structure as a problem in Minkowski space . . . . .	3
Basis light-front quantisation . . . . .	3
Discussion . . . . .	3
NNPDFs for meson structure . . . . .	3
Accessing pion's large-x gluon by fixed-target charmonium production . . . . .	3
EHM via meson light-front wave functions - Part 1 . . . . .	4
EHM via meson light-front wave functions - Part 2 . . . . .	4
High-energy factorization for DY with new TMD (unintegrated) PDFs . . . . .	4

Discussion . . . . .	4
EHM and the spectrum of light mesons . . . . .	4
EHM as revealed by the spectra of baryons with heavy quarks . . . . .	4
Synergies with EHM at Jlab . . . . .	4
Model independent extraction of hadron radii . . . . .	5
Round-table discussion . . . . .	5

**Day I - Introduction / 7**

## **Introductory talk**

**Corresponding Author:** oleg.denisov@cern.ch

**Day I - Introduction / 8**

## **Probing EHM with AMBER**

**Corresponding Author:** cdoberts@nju.edu.cn

**Approved measurements / 9**

## **Charged proton-radius measurement**

**Corresponding Author:** alexey.dzyuba@cern.ch

**Approved measurements / 10**

## **Antiproton cross-section measurements for Dark Matter search**

**Corresponding Author:** paolo.zuccon@cern.ch

**Approved measurements / 11**

## **Probing the pion's parton structure at AMBER**

**Corresponding Author:** stephane.platchkov@cern.ch

**Envisaged measurements / 12**

## **Probing the kaon's parton structure at AMBER Phase-2**

**Corresponding Author:** vincent.andrieux@cern.ch

**Envisaged measurements / 13**

## **Measuring excitation spectra in $K \pi \pi$ final states with AMBER Phase-2**

**Corresponding Author:** boris.grube@cern.ch

Envisaged measurements / 14

## **Measuring the Primakoff reaction and $F_{\{K2\pi\}}$ with AMBER phase-II**

**Corresponding Author:** andrii.maltsev@cern.ch

Day I - / 15

## **Can AMBER Phase-2 access the charge radius of pion or/and kaon?**

**Corresponding Author:** jan@tum.de

Day I - / 16

## **Can AMBER Phase-2 access Moments of pion/kaon Distribution Amplitudes in Diffractive Scattering?**

**Corresponding Author:** oleg.denisov@cern.ch

Day II / 17

## **Lattice QCD for AMBER**

**Corresponding Author:** dgr@jlab.org

Day II / 18

## **Meson DFs from Lattice QCD**

**Corresponding Author:** nkarthik@bnl.gov

Day III / 19

## **Pion DAs in AMBER**

**Corresponding Author:** stefanis@tp2.ruhr-uni-bochum.de

Day II / 20

## **EHM via Meson GPDs**

Corresponding Author: josemanuel.morgado@dcu.uhu.es

Day II - / 21

## **Basic EHM from Lattice QCD**

Corresponding Author: jonivar@thphys.nuim.ie

Day II - / 22

## **Pion structure as a problem in Minkowski space**

Corresponding Author: ydrefors@kth.se

Day II - / 23

## **Basis light-front quantisation**

Corresponding Author: xbzhao@impcas.ac.cn

Day II - / 24

## **Discussion**

Day III / 25

## **NNPDFs for meson structure**

Corresponding Author: j.rojo@vu.nl

Day III / 27

## **Accessing pion's large-x gluon by fixed-target charmonium production**

Corresponding Author: wen-chen.chang@cern.ch

Day III / 28

## **EHM via meson light-front wave functions - Part 1**

Corresponding Author: khepani@gmail.com

Day III / 29

## **EHM via meson light-front wave functions - Part 2**

Corresponding Author: jose.rodiguez@dfaie.uhu.es

Day II / 30

## **High-energy factorization for DY with new TMD (unintegrated) PDFs**

Corresponding Author: nefedovma@gmail.com

Day III / 31

## **Discussion**

Day IV / 32

## **EHM and the spectrum of light mesons**

Corresponding Author: lei.chiong@gmail.com

Day IV / 33

## **EHM as revealed by the spectra of baryons with heavy quarks**

Corresponding Author: jsegovia@upo.es

Day IV / 34

## **Synergies with EHM at Jlab**

Corresponding Author: mokeev@jlab.org



**Day III / 35**

## **Model independent extraction of hadron radii**

**Corresponding Author:** binosi@ectstar.eu

**Day IV - Round table / 36**

## **Round-table discussion**

Wolf-Dieter Nowak / Craig Roberts

Stephane Platchkov

Vincent Andrieux

Andrii Maltsev

Boris Grube

Jan Friedrich

Oleg Denisov

...

and all other participants