‘The strong interaction at the frontier of knowledge: fundamental research and applications’

NA2 – Small-x Physics at the LHC and future DIS experiments

Cyrille MARQUET
École polytechnique and CNRS

STRONG-2020 Kick-off meeting

October 23-25, 2019

NA2 – Small-x Physics at the LHC and future DIS experiments

Organization and participants

- Spokespersons: Néstor Armesto (Santiago de Compostela) and Tuomas Lappi (Jyväskylä).
- Participants: 15 institutions, 9 countries, 24 permanent researchers.

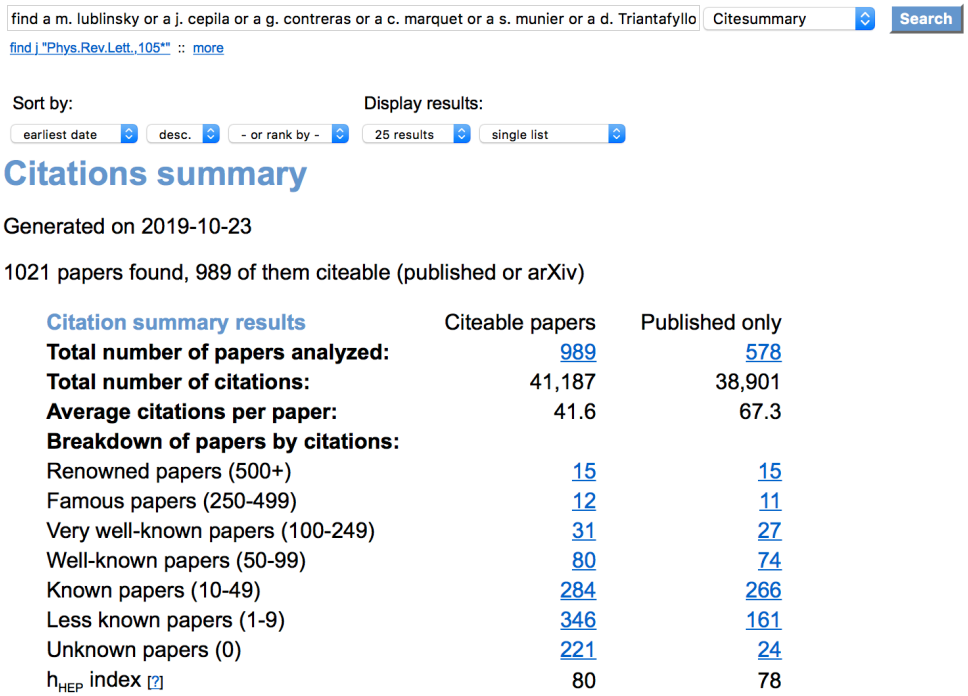
- Ben-Gurion University of the Negev, Beer Sheva, Israel.
- Centre National de la Recherche Scientifique, France.
- Czech Technical University, Prague, Czech Republic.
- ECT*, Trento, Italy.
- Henryk Niewodniczański Institute of Nuclear Physics, Krakow, Poland.
- Commissariat à l'énergie atomique, Saclay, France.
- National Centre for Nuclear Research, Warsaw, Poland.
- Universidad Autónoma de Madrid, Spain.
- Universidad de Granada, Spain.
- Universidade de Santiago de Compostela, Spain.
- Università della Calabria, Cosenza, Italia.
- Università de Firenze, Italia.
- University of Groningen, The Netherlands.
- University of Jyväskylä, Finland.
- University of Regensburg, Germany.

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

NA2 – Small-x Physics at the LHC and future DIS experiments

Participants

- We aim at strengthening the communication and collaboration between the European groups involved in theoretical and phenomenological studies of small-x physics.
- Our WP comprises most of the theoretical small-x community in Europe, with a large impact in recent years (>2011).
- We welcome and expect new recruits (e.g. in Warsaw) and recruits in new institutions (e.g. in Bielefeld) to join our effort



find a m. lublinsky or a j. cepila or a g. contreras or a c. marquet or a s. munier or a d. Triantafyllo | Citesummary | Search

find j "Phys.Rev.Lett.,105*" :: more

Sort by: earliest date desc. - or rank by - Display results: 25 results single list

Citations summary

Generated on 2019-10-23

1021 papers found, 989 of them citeable (published or arXiv)

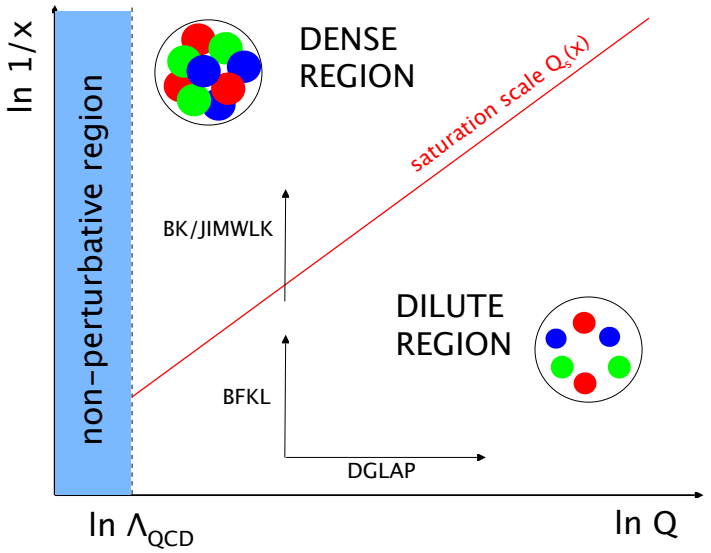
Citation summary results	Citeable papers	Published only
Total number of papers analyzed:	989	578
Total number of citations:	41,187	38,901
Average citations per paper:	41.6	67.3
Breakdown of papers by citations:		
Renowned papers (500+)	15	15
Famous papers (250-499)	12	11
Very well-known papers (100-249)	31	27
Well-known papers (50-99)	80	74
Known papers (10-49)	284	266
Less known papers (1-9)	346	161
Unknown papers (0)	221	24
h_{HEP} index [?]	80	78

http://inspirehep.net/search?ln=en&ln=en&p=find+a+m.+lublinsky+or+a+j.+cepila+or+a+g.+contreras+or+a+c.+marquet+or+a+s.+munier+or+a+d.+Triantafyllopoulos+or+a+k.+kutak+or+a+s.+sapeta+or+a+f.+gelis+or+a+e.+iancu+or+a+g.+soyez+or+a+s.+wallon+or+a+altinoluk+or+a+l.+Szymanowski+or+a+sabio+vera+or+a+albacete+or+a+armesto+or+a+a.+papa+or+a+d.+colferai+or+a.+d.+boer+or+a+t.+lappi+or+a+k.+eskola+or+a+h.+paukkunen+and+not+cn+alice+and+date+after+2011+and+not+cn+h1&of=hcs&action_search=Search&sf=earliestdate&so=d&rm=&rg=25&sc=0

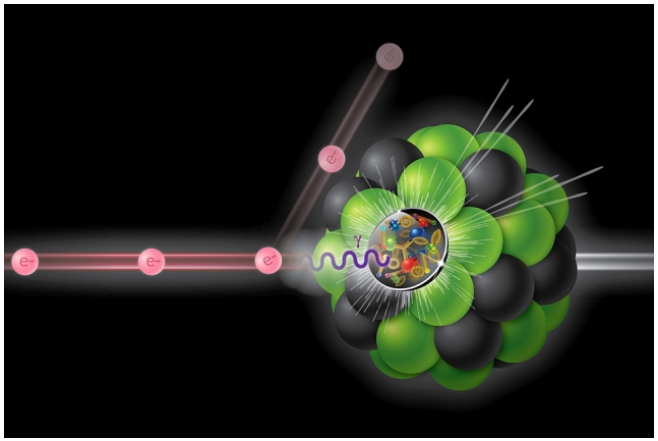
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824093.

NA2 – Small-x Physics at the LHC and future DIS experiments

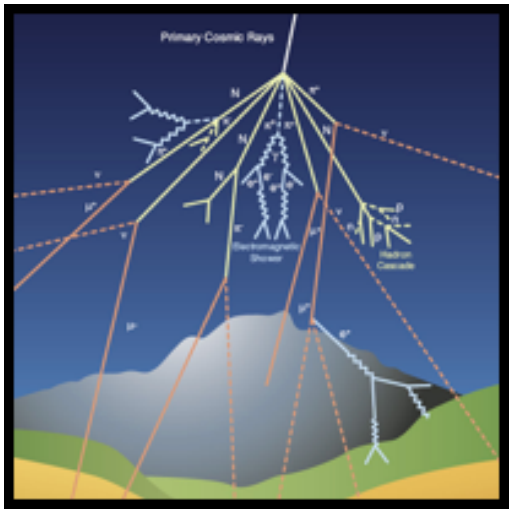
Small-x physics



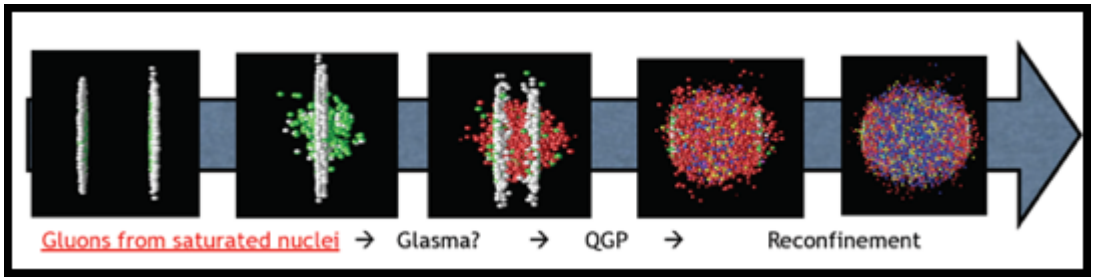
Electron Ion Collider (EIC)



high-energy cosmic rays



initial stages of heavy-ion collisions



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

NA2 – Small-x Physics at the LHC and future DIS experiments

Objectives

➜ Nuclear PDFs: factorisation at small x, impact of new methods for determination and new data from RHIC and the LHC.

➜ Resummation in small-x evolution equations and production cross sections.

➜ New NLO calculations for new observables.

➜ Correlation calculations for more than 2 particles.

➜ Improving models for colour correlations inside hadrons and nuclei and their interplay with hydrodynamics.: connection with pp and UPCs @ LHC.

➜ Relations with spin physics (TMDs) at small x.

➜ Proposal of observables disentangling fixed-order, resummed and non-linear approaches.

➜ Implications of small-x CGC dynamics on thermalisation.

Exploring the possibilities of the future runs at RHIC and the LHC, and of future experimental programs on ep/A collisions, to clarify the structure of the non-linear regime of QCD.

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

NA2 – Small-x Physics at the LHC and future DIS experiments

Tasks

we are there

TASKS/Subtasks	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Nuclear PDFs																
1.1 Perform a reweighting analysis of nuclear PDFs with LHC data								■								
1.2 Produce a new nuclear PDF set																■
2. NLO Calculations in CGC and BFKL																
2.1 Compare NLO calculations with DIS and forward pA data								■								
2.2 Establish the connection between the CGC formulation at NLO and resummations in BFKL																■
3. Gluon TMDs at small-x																
3.1 Establish (or disprove) TMD factorization for processes with three final-state particles								■								
3.2 Establish (or disprove) TMD factorization at NLO, starting with the simplest processes, e.g. for photon+jet																■
3.3 Implement the hard-scale evolution of TMDs, on top of the small-x evolution												■				
3.4 Develop the phenomenology for processes sensitive to the linear polarization of gluons						■										
4. Multi-particle Correlations & Thermalization																
4.1 Combine calculations of initial and final state multiparticle correlations												■				
4.2 Establish the initial state for kinetic theory or hydrodynamical calculations from the CGC																■

- The tasks are divided between participating institutions, with four leading ones (Jyvaskyla 1, CNRS 2, Krakow 3, Santiago 4)

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

NA2 – Small-x Physics at the LHC and future DIS experiments

Budget

Item	Comments	Amount (EUR)
Travel money	1000 EUR times 4 years times # of participating teams (16), for travels/stays within the NA and for attendance at conferences and workshops organised by or with active participation of the NA participants	64000
Personnel	3 postdocs years, shared between institutions to enhance researcher mobility and collaborations within the network	120000
Total	Overheads not included	184000

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

NA2 – Small-x Physics at the LHC and future DIS experiments

Concrete Plans

- Postdoc #1: Joint Santiago/Jyvaskyla position [Task 1]
  Fall 2020 -> Fall 2022 with second year funded by STRONG2020

- Postdoc #2: Joint Krakow/CNRS (Orsay&Palaiseau) position [Task 3]
  Fall 2020(1) -> Fall 2022(3) fully funded by STRONG2020

- Workshop #1: ECT* Trento July 6-10 2020 (NA2 contact: A. Sabio Vera)
- Workshop #2: considering ECT* again in ETC* for 2021 (if successful)
- Workshop #3: considering NCBJ Warsaw (T. Altinoluk, G. Beuf) for 2022

- Travel funds within consortium: requests handled by the WP leaders on a case-by-case basis; 3 trips planned so far
  1 scientific visit (CNRS to Warsaw) & trips to Nantes for 2 representatives

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

NA2 – Small-x Physics at the LHC and future DIS experiments

Status Report

4.5 months into the project (~10% of total duration)

- First publications acknowledging STRONG2020:

  Effect of non-eikonal corrections on azimuthal asymmetries in the Color Glass Condensate
  P. Agostini, T. Altinoluk and N. Armesto, Eur. Phys. J. C79 (2019) no9, 790

  Towards a complete next-to-logarithmic description of forward exclusive diffractive dijet electroproduction at HERA: real corrections
  R. Boussarie, A.V. Grabovsky, L. Szymanowski and S. Wallon, Phys.Rev. D100 (2019) no.7, 074020

- STRONG2020 already acknowledged in conference talks
  e.g. Light-Cone (Sep. 2019), …

- Milestone MS13 (one of four) delivered before the end of the year, corresponding to the 1st part of deliverable D13.3

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

Thank you!

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