



# LHCC Heavy Ion Working Group First meeting

7<sup>th</sup> July 2021



HONEXCOMB, aka JRA1-WP19 = LHC-Combine of STRONG-2020



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



## What is Strong-2020 ?

A 10 M€ project to facilitate, structure and coordinate the European efforts made to understand the strong interaction (hadronic structure, heavy-ion collision...)

→ <http://www.strong-2020.eu>

- 44 participant institutions, embracing 14 EU Member States, 1 International EU Interest Organization (CERN), and 1 EU candidate country
- + host institutions in 21 other countries (without EU funds benefits) = 36 countries
- 32 Work Packages (WP): 7 Transnational Access (TA<sup>(\*)</sup>), 2 Virtual Access (VA), 7 Networking Activities (NA) and 14 Joint Research Activities (JRA) *including HonexComb (aka LHC-Combine)*
- 2 WPs for “Management and Coordination” of the project and of “Communication and Outreach”
  - <sup>(\*)</sup>TA list: COSY, MAMI, LNF, FTD/ELSA, GSI, ECT\*, CERN

# 0 – The HonexComb idea

“ Inter-experiment combination of heavy-ion measurements at the LHC ”

- Animation of a vivid forum
- Cross-experiment combination work (papers)

+ other actions

- Comparing methods or observables (Centrality...)
- Producing or endorsing comparison plots
- Identifying (and solving) tensions\*

\*  $Y(nS)$  ATLAS vs CMS;  $Z$  ATLAS vs CMS;  $\Lambda_c/D0$  LHCb vs ALICE;  $R_{AA}$  at high  $p_T$  ALICE vs CMS...



ALICE



# 1 – HonexComb work (kick off)

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Identify 4 spokespersons / contacts + hosts for 4x1 year of postdoc

- Alexander Kalweit (CERN) in Alice + Jacek Otwinowski (INP, Krakow, Poland);
- Iwona Grabowska-Bold (AGH UST, Krakow, Poland) in Atlas;
- Giulia Manca (INFN Cagliari, Italy) in LHCb;
- Raphaël Granier de Cassagnac (Polytechnique, France) in CMS.

+ 2 theorists as of early 2021

- Christian Bierlich (Lund, Sweden) Jacopo Ghiglieri (Subatech, France)

Set up communication tools

- Wiki : <https://twiki.cern.ch/twiki/bin/view/Honexcomb>
- Mailing list (100+ people) [honex-comb@cern.ch](mailto:honex-comb@cern.ch) created ([feel free to subscribe](#))
- Meetings : kick-off in January 2020, 11 meetings as of today (9 remote, does not help)

→ <https://indico.cern.ch/category/11797/>

# 1 – HonexComb Work (list of topics)

Discussed in meetings (#talks)

- Heavy Flavours\* (7)
- nPDF (3)
- Quarkonia (2)
- Light-by-light scattering (2)

From proposal

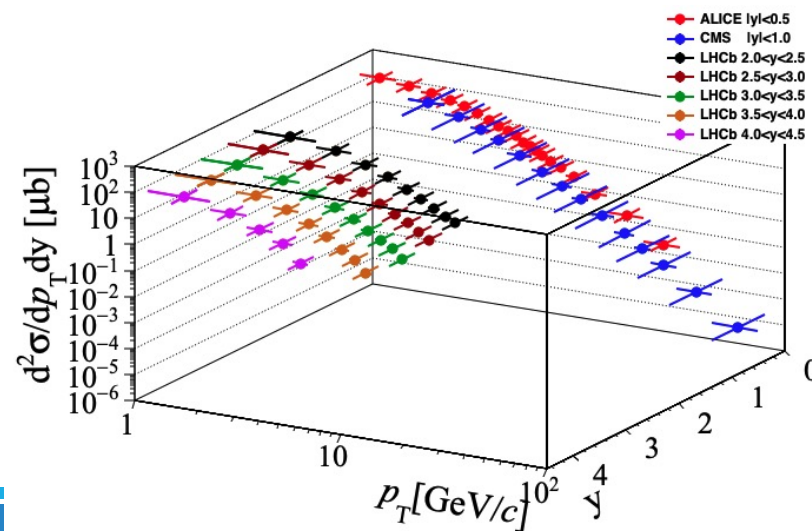
- + Centrality definition
- + Top quarks
- + Jets\* (2)
- + Anomalous em moment of tau

\* Connections with NA3 and NA7

+ First identified common work

Small team to work out a first combination in complementary phase space (ALICE+CMS+LHCb)

Open charm cross section (total + differential)



(see Sun in meeting #11)

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Measured cross sections (in nb) :

CMS(2015)	= $120 \pm 46 \pm 28 \pm 12$
ATLAS(2015+18)	= $120 \pm 17 \pm 13 \pm 4$

Extrapolation to common fiducial region  
proper combination → 10% improvement,  
Looking forward to 2018 CMS result

(see Krintiras in [meeting #11](#))

+ **Second identified common work**

Small team to work out a first combination  
in the same phase space (ATLAS+CMS)  
in order to raise the significance

## 2 – EU Deliverables and Milestones

D19.1 = Vivid Forum / January 2020 / <https://twiki.cern.ch/twiki/bin/view/Honexcomb>

MS32 = Kick-off / January 2020 / <https://indico.cern.ch/event/872670/>

D19.2 = Road Map / April 2020 / <https://twiki.cern.ch/twiki/pub/Honexcomb/WebHome/Roadmap.pdf>

Work package number	19															
Work package acronym	LHC-Combine															
Work package title	JRA1-Inter-experiment combination of heavy-ion measurements at the LHC															
<b>TASKS/Subtasks</b>	<b>Year 1</b>				<b>Year 2</b>				<b>Year 3</b>				<b>Year 4</b>			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>1. Animation of a forum</b>		1														
<b>2. Cross-experiment combination work</b>				2												



## 3 – Progress

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Beyond the state of the art? A 4-experiment forum exists since 2020

→ Trigger the creation of this LPMC heavy-ion WG (for official endorsement and to live beyond Strong-2020)

Expected results? Work in progress, two topics are identified, more to come (quarkonium feeddown, jets...)

Postdocs hiring procedure almost completed

- In CMS @ Polytechnique: Florian Damas (from Alice) joined in February
- In LHCb @ INFN Cagliari: Jiayin Sun, starting on Sep. 1<sup>st</sup>, but already here
- In ALICE @ INP, Krakow: Sándor Lökös, starting on Sep. 1<sup>st</sup> with Jacek Otwinowski
- In ATLAS @ AGH UST, Krakow: Still looking, contact [lwona Grabowska-Bold](#) → <https://inspirehep.net/jobs/1869761>

All happy to work in close collaboration with the working group!





# Conclusions

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- Honexcomb nice project to bring physicists from different experiments to work together on Heavy Ions
- Relaxed and constructive atmosphere
- Good starting point for the LHCC group! Will work in parallel for a few years.
- For more information please contact us !
  - Meetings usually last Tuesday of the month.