ENGAGING THE CLASSROOM

ATLAS VISITS, VIRTUAL VISITS, MASTERCLASSES, CHEAT SHEETS AND MORE

Joni Thu LH Pham (CoEPP, University of Melbourne), on behalf of the ATLAS Collaboration

ATLAS EXPERIMENT

MOTIVATION

- Students of all ages and levels can benefit from visual resources for learning particle physics.
- Aim to bring the excitement of scientific exploration and discovery into classrooms.
- Interactions between particle physicists and students are extremely beneficial on both ends.

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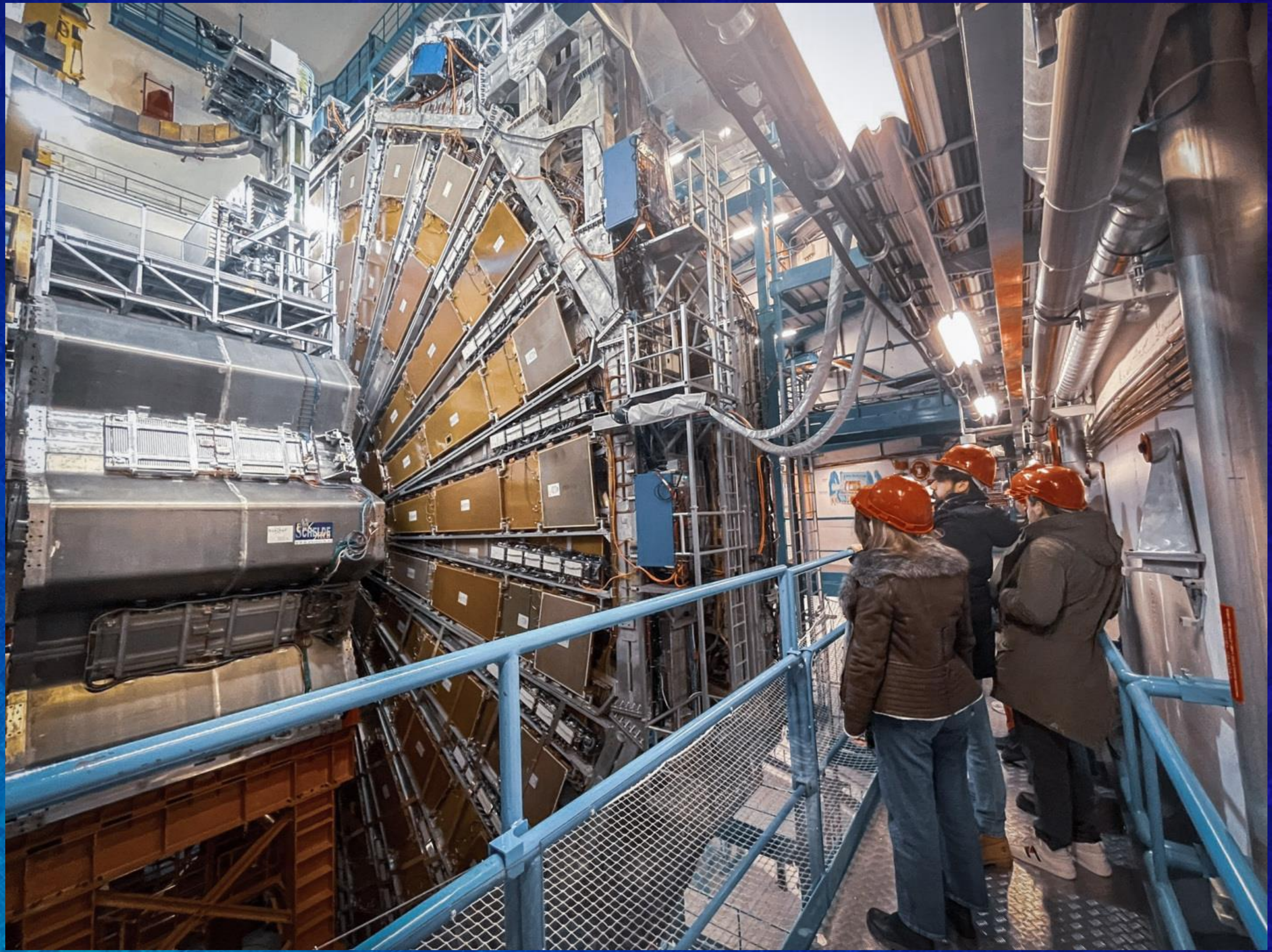
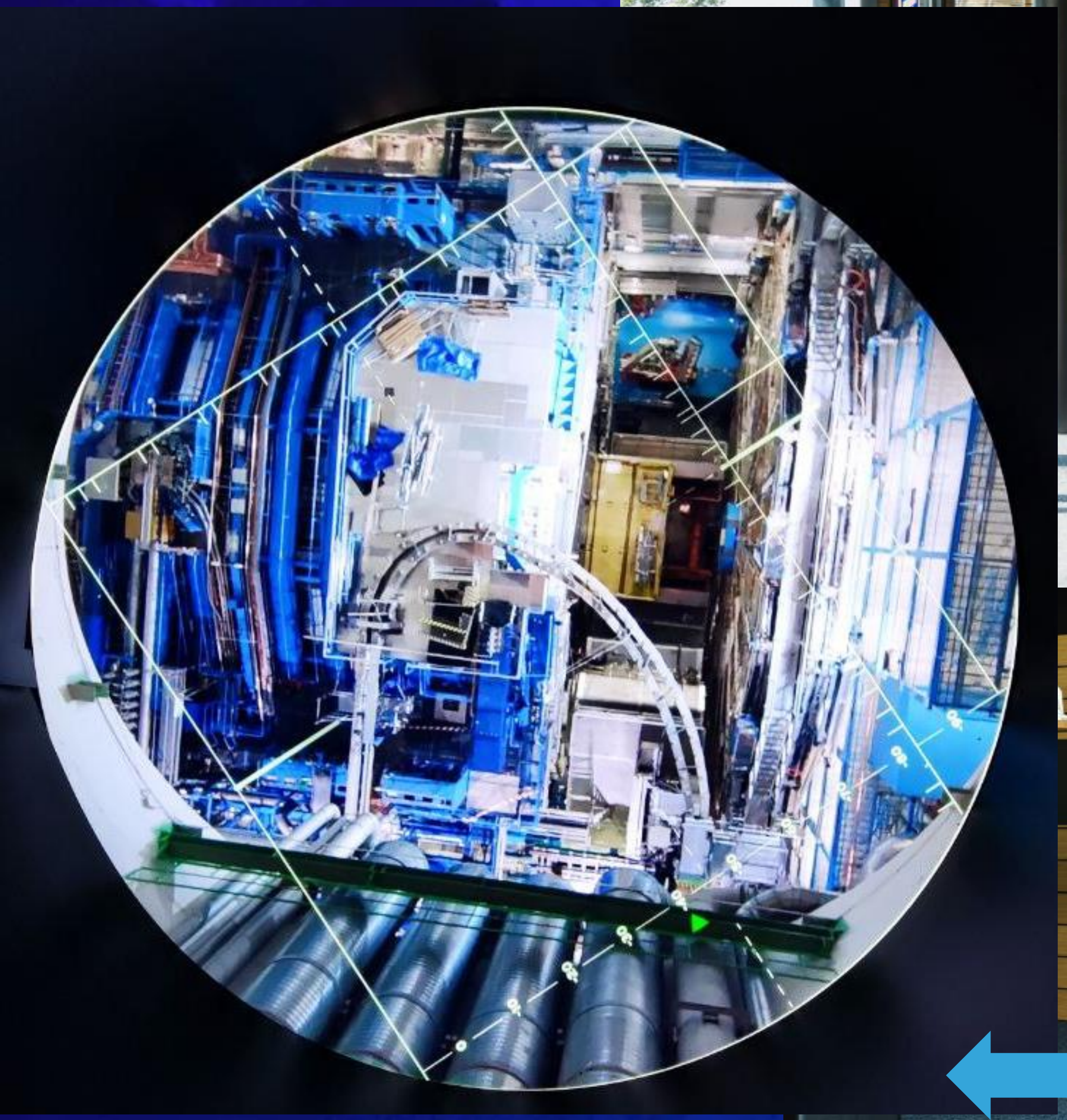


University of Bologna students visiting the ATLAS Underground Cavern, Jan 2023

ATLAS EXPERIMENT

ATLAS VISITOR CENTRE



- One of CERN’s official visit sites
- Adjacent to ATLAS Control Room (P1, Meyrin), with windows that can be made transparent or opaque.

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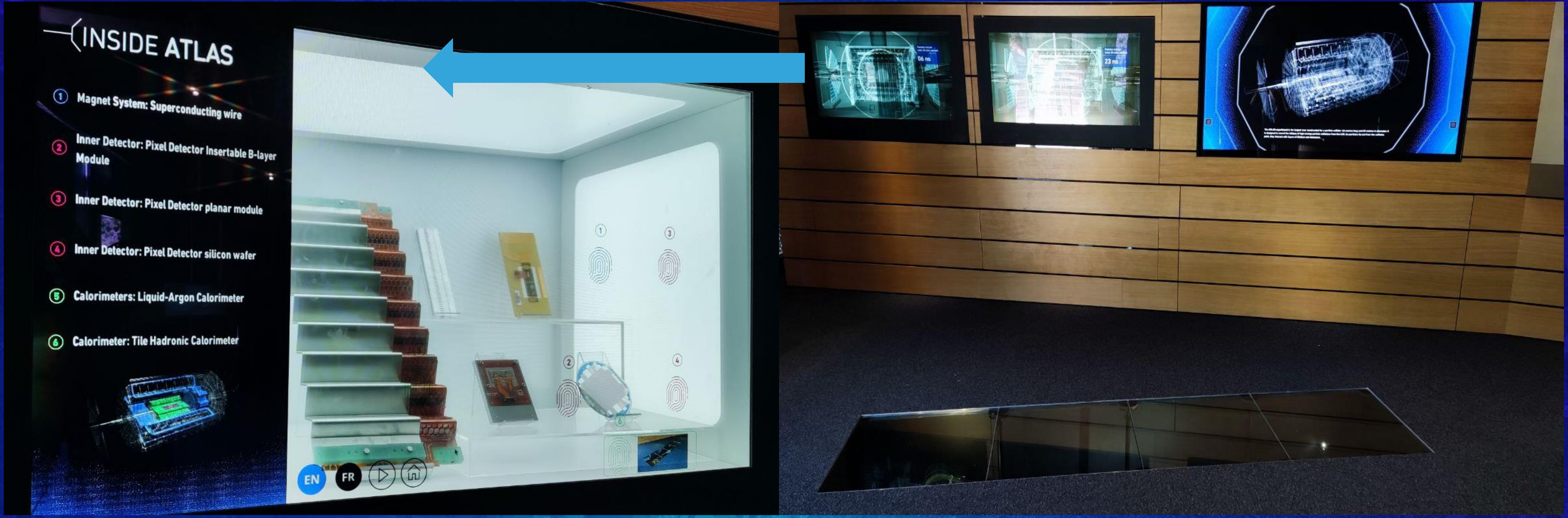
ATLAS VISITOR CENTRE

- Many interactive screens and exhibitions



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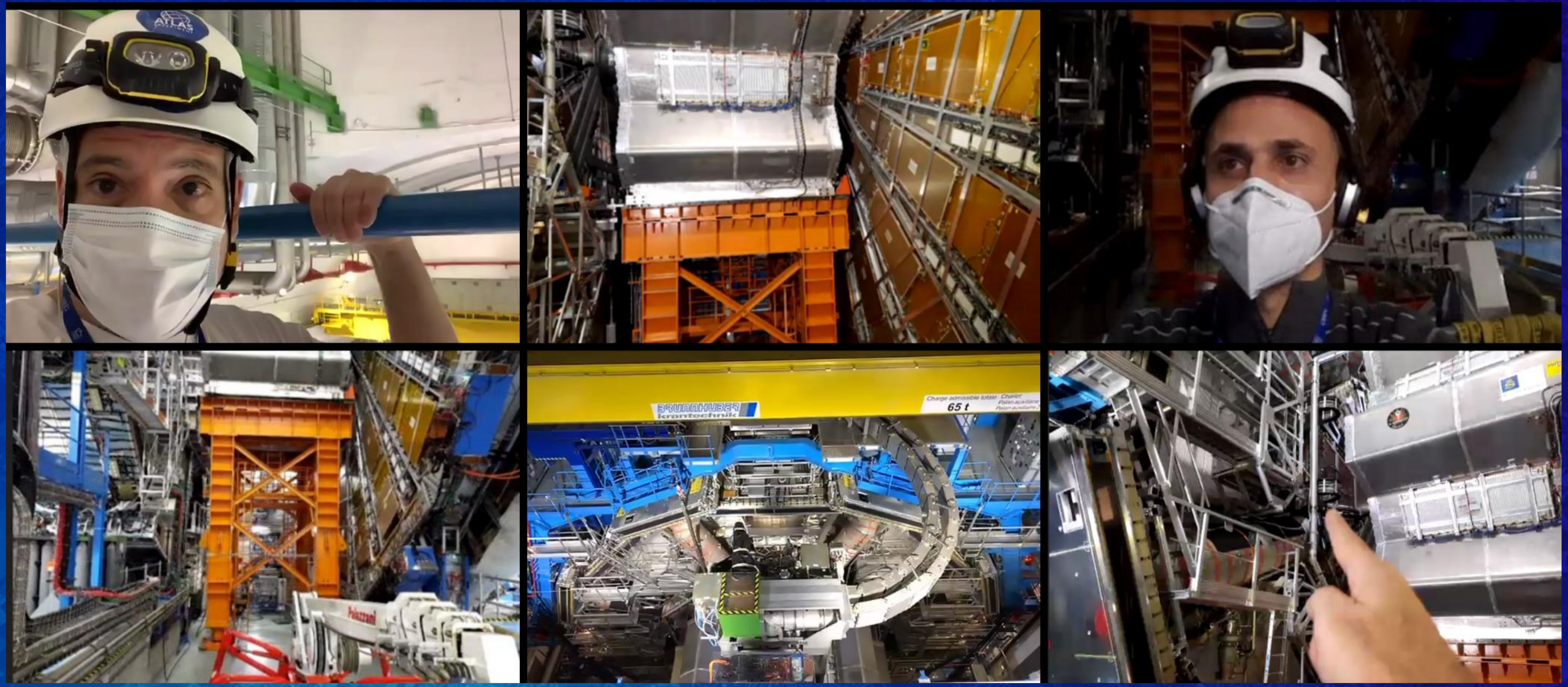
VIRTUAL VISITS

- Virtual Visits designed to give participants an experience without coming to CERN.
- Remote connection (Zoom) from ATLAS Cavern or Visitor Centre.
- Average of ~120 visits per year.
- Visitors from all over the world.



ATLAS VV for National Youth Science Forum by Dr Goldfarb and Dr Alhroob , Jan 2023, Australia

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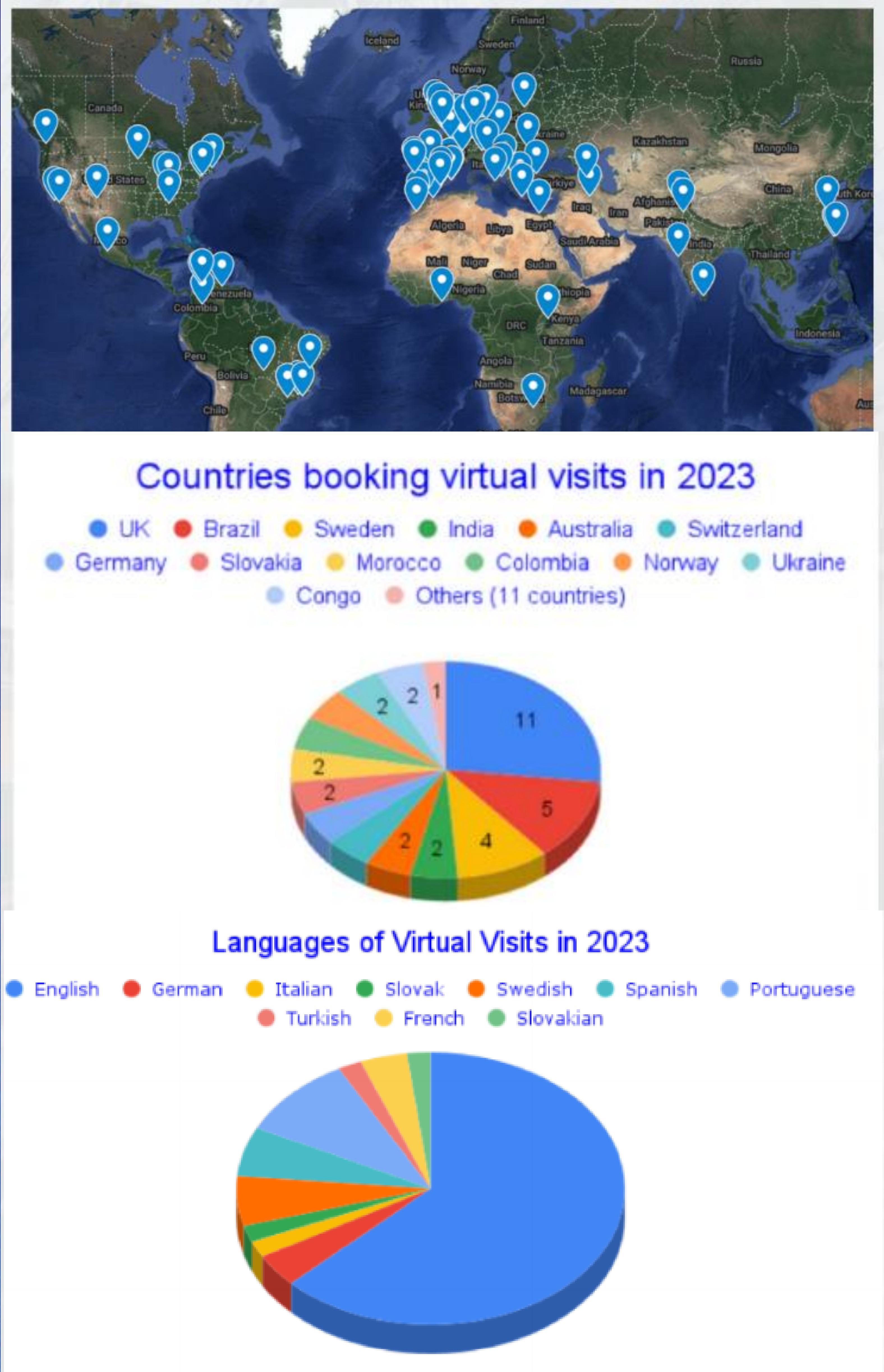
VIRTUAL VISITS

- 2023: 50+ visits from 24 countries in the first 6 months.
- 2022: 121 visits from 36 countries, 8 languages.
- Between 10-600 participants per visit.
- Open visits for individuals on a regular basis.
- Cavern visit streamed when possible.



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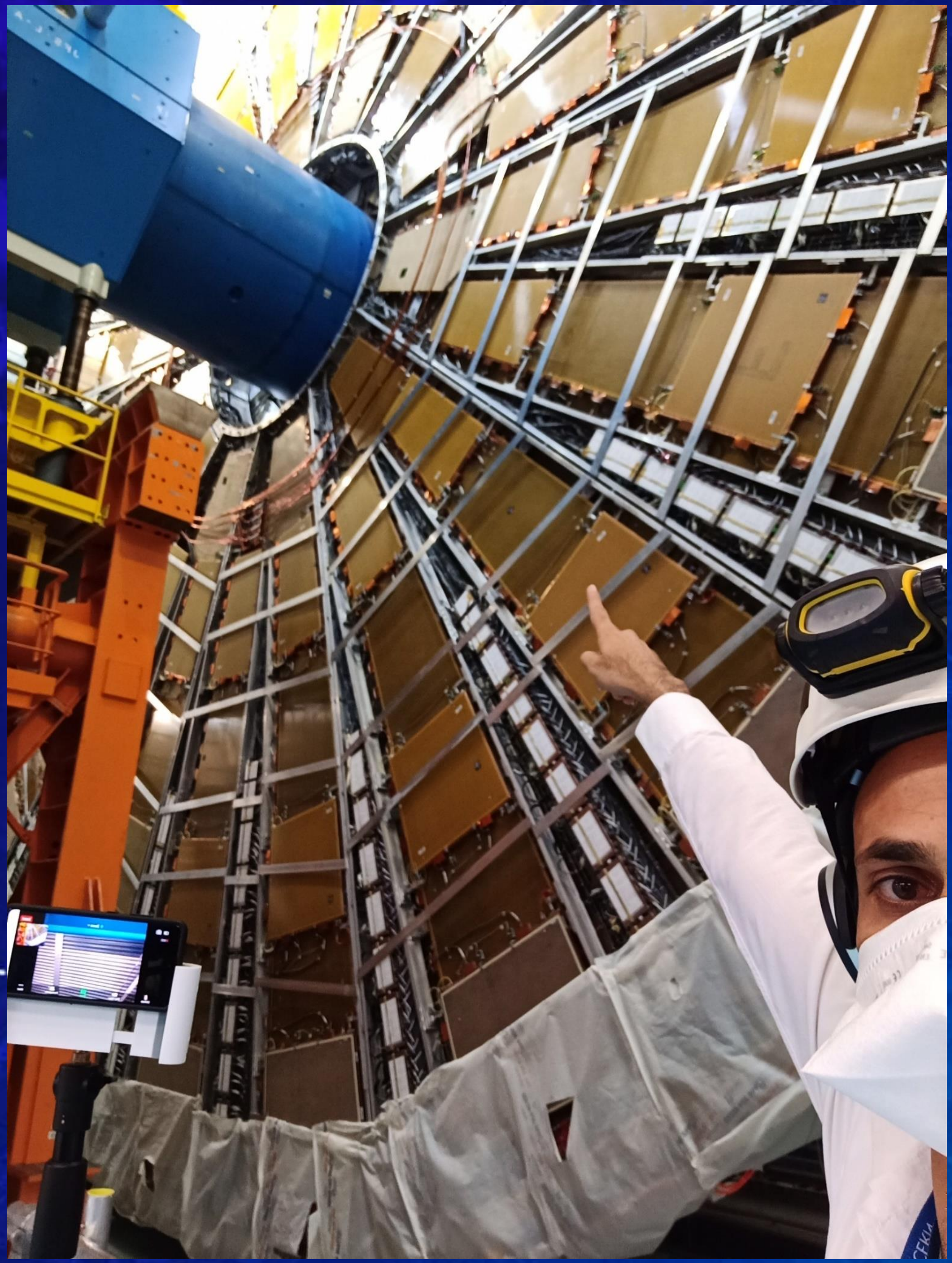
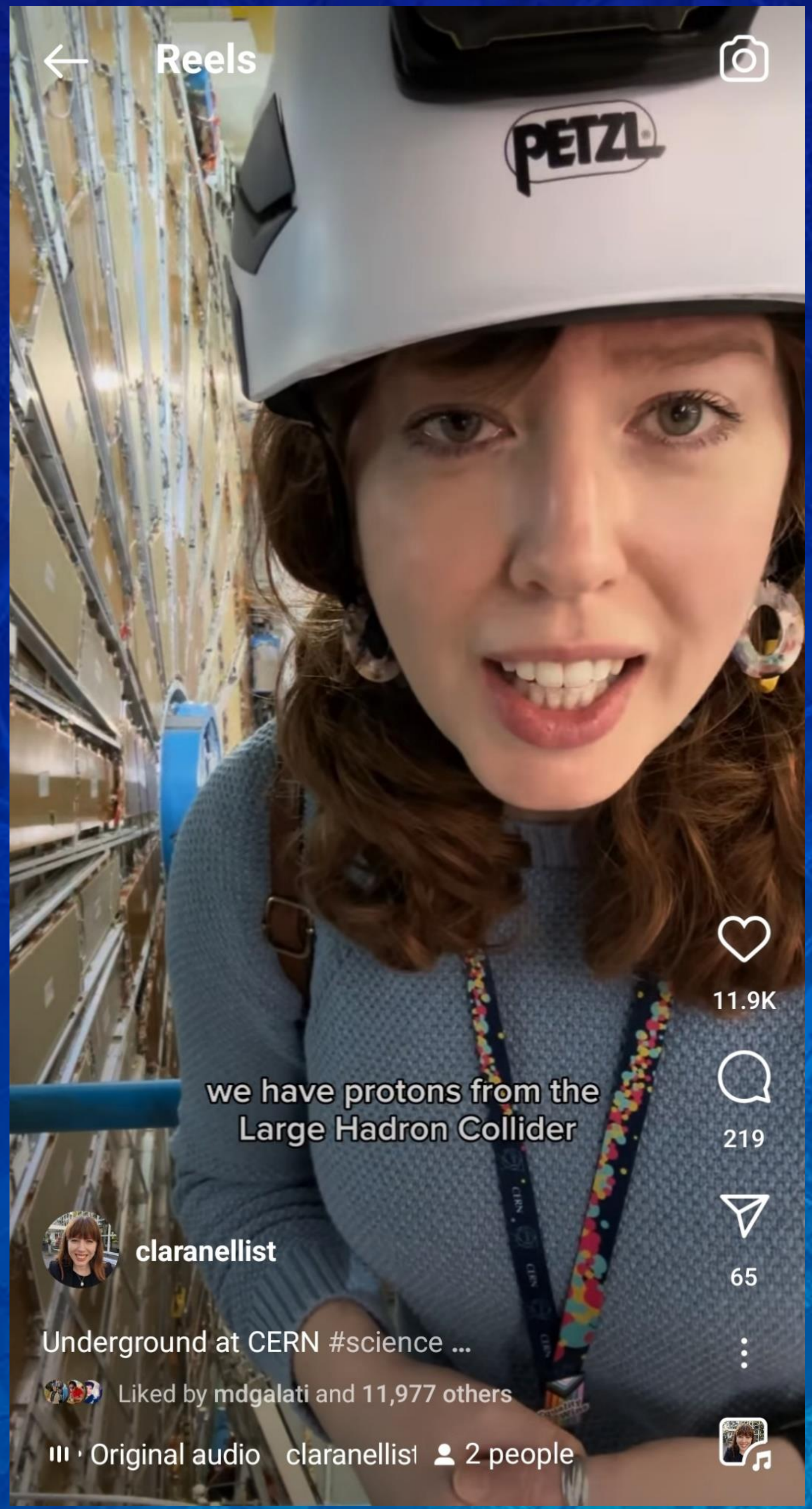
VIRTUAL VISITS

- Some visits livestreamed to YouTube, TikTok, or other platforms.





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INTERNATIONAL MASTERCLASSES

Annual program in collaboration with IPPOG.

13,000 high school students, 200+ places, 55 countries (2023):

- Get insight into topics and methods of basic research at the fundamentals of matter & forces.
- Perform measurements on real CERN experiments' data
- Participate in an international video conference for discussion of results.

Dr Goldfarb and Ukrainian students Tiulchenko & Boreiko hosted ATLAS VV for IMC, Kharkiv, Apr 2023.

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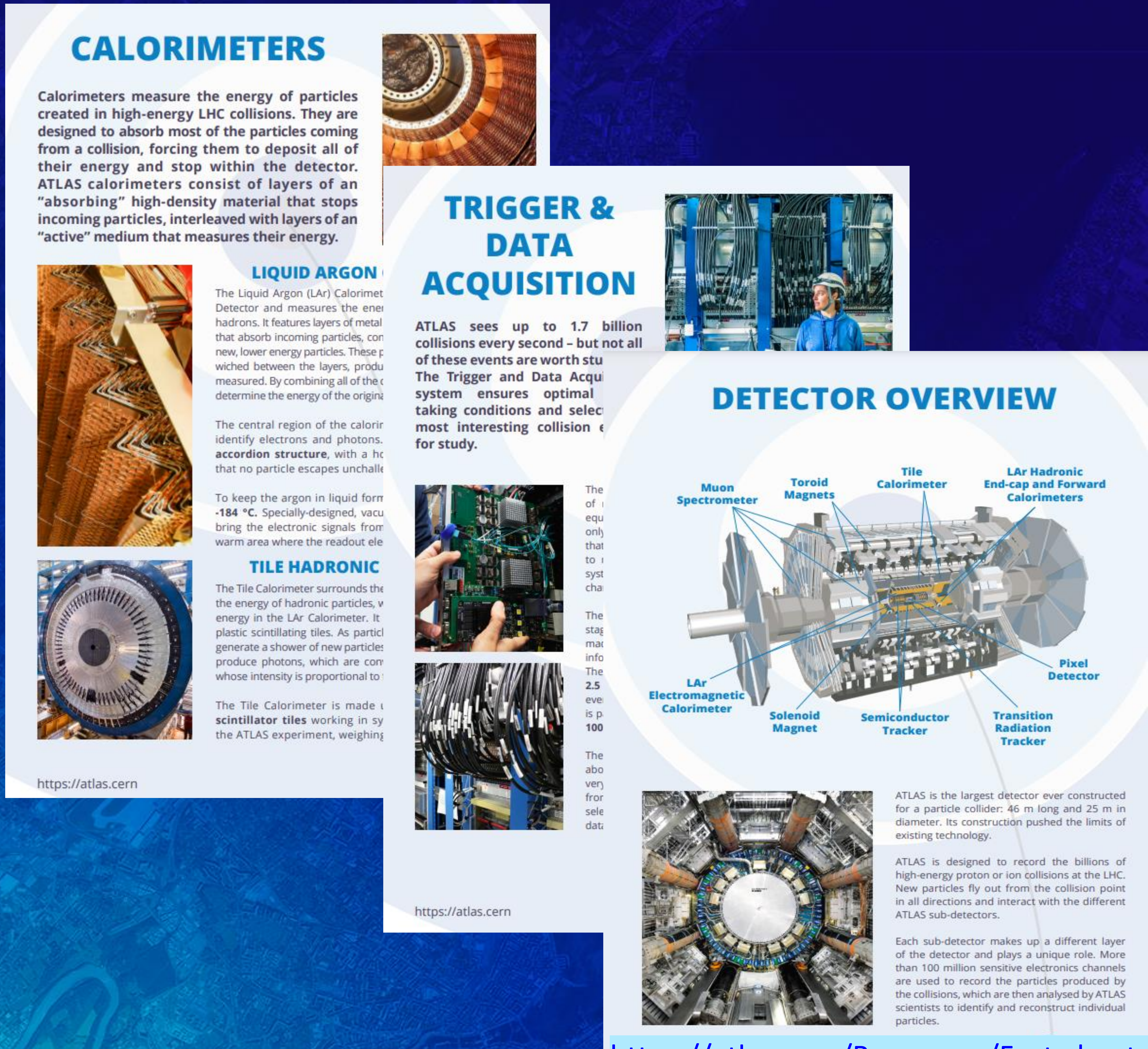
FACT SHEETS

- Collect facts about ATLAS detector, collaboration, and physics programme all in one place.
- Clear, concise and visually appealing.
- 10 sheets currently available.



https://atlas.cern/Resources/Fact-sheets

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CHEAT SHEETS

- Designed to make ATLAS' online scientific material more accessible to a wider audience.
- One concept covered per sheet.
- 5 sheets currently available.
- Coming soon: Statistical Significance Cheat Sheet.

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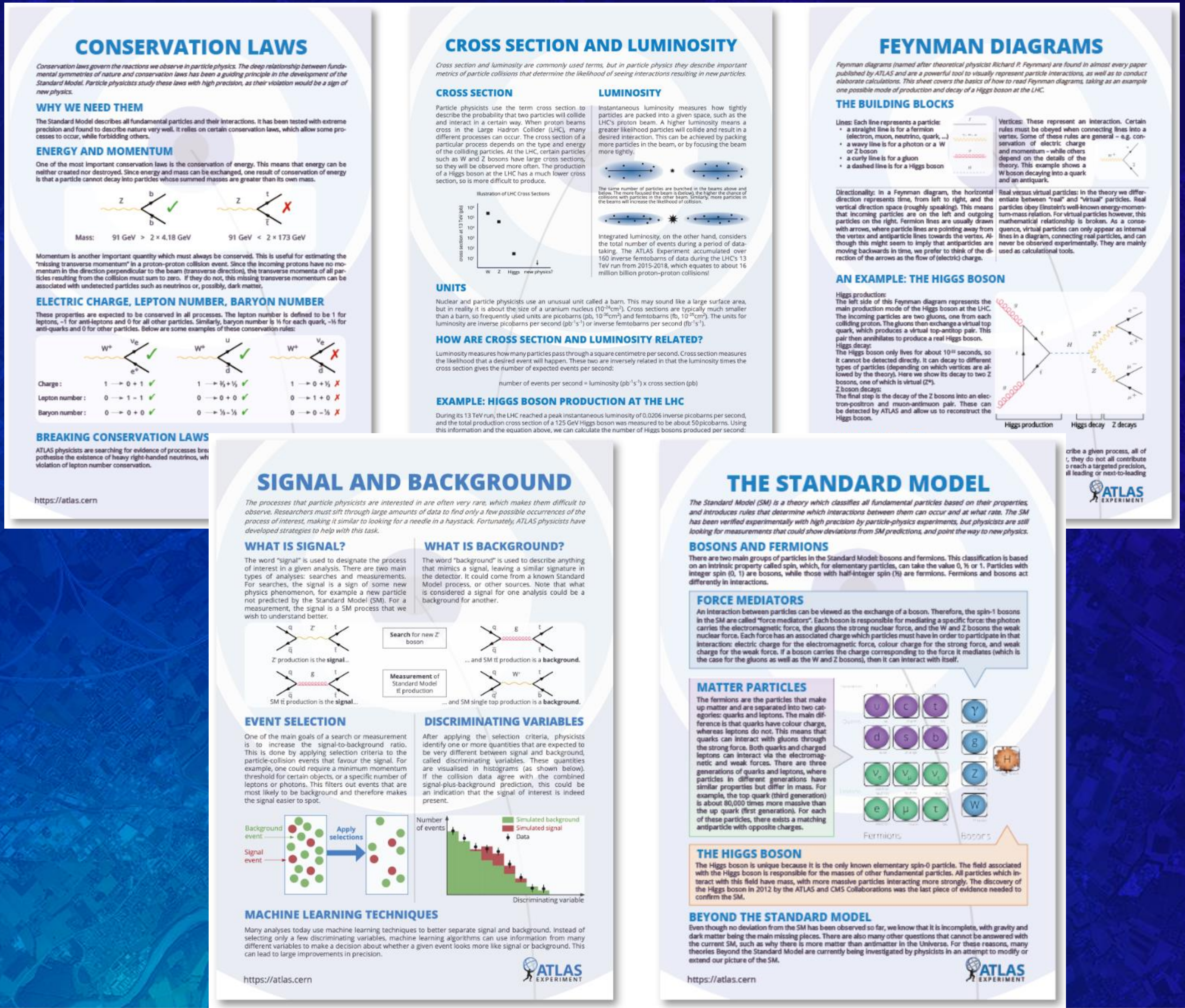
https://atlas.cern/Resources/Cheat-sheets

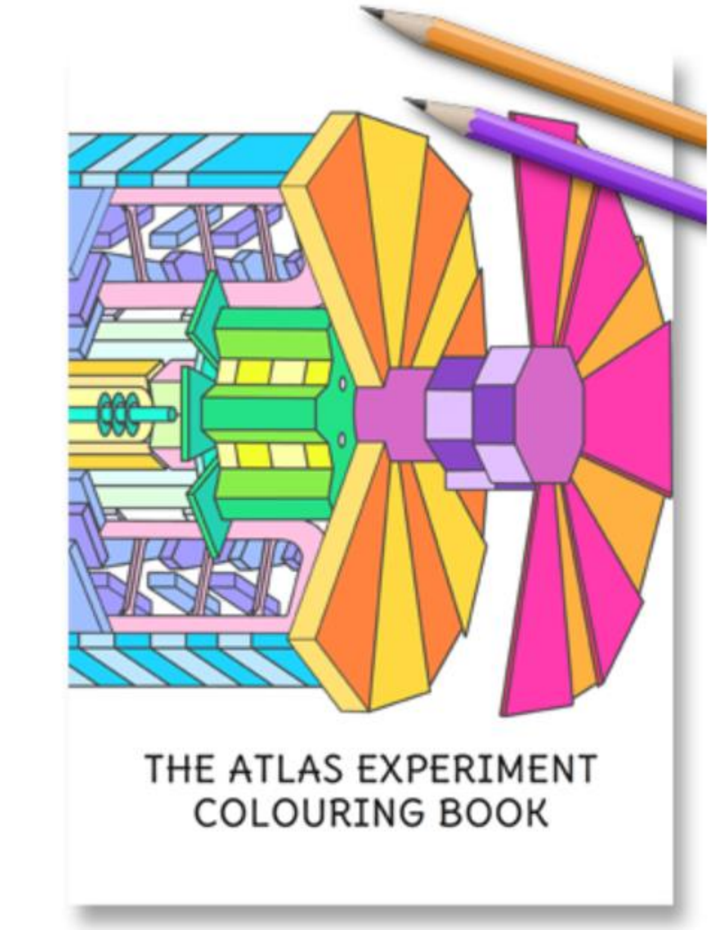


ATLAS EXPERIMENT

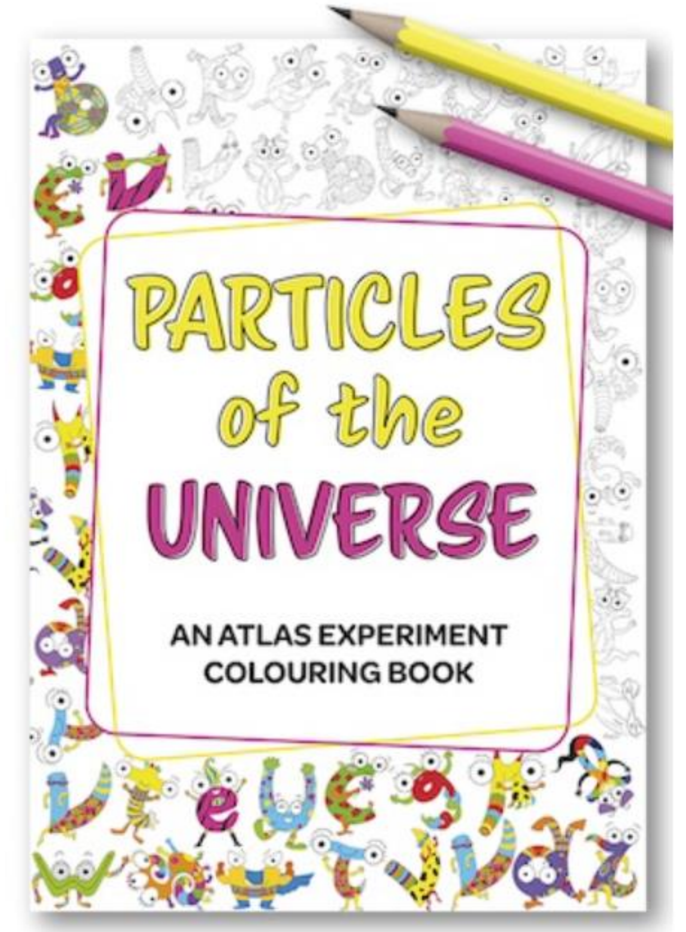
ACTIVITY BOOKS

- Wide range of educational materials for all ages & levels of expertise.
- Colouring Books (2), Teachers Guide (1) & Activity Sheets (5)
- Printed & Distributed by CERN Education Team & others for events & schools

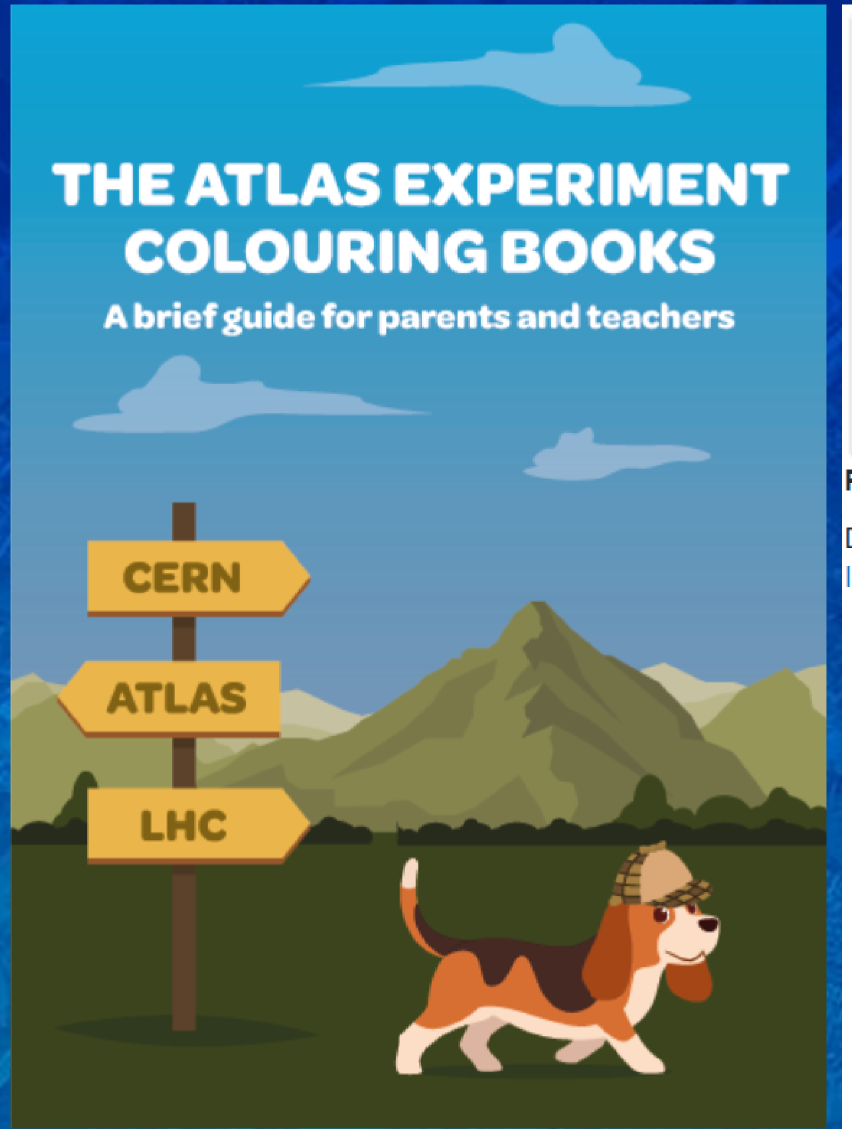
https://atlas.cern/Resources/Colouring-Books

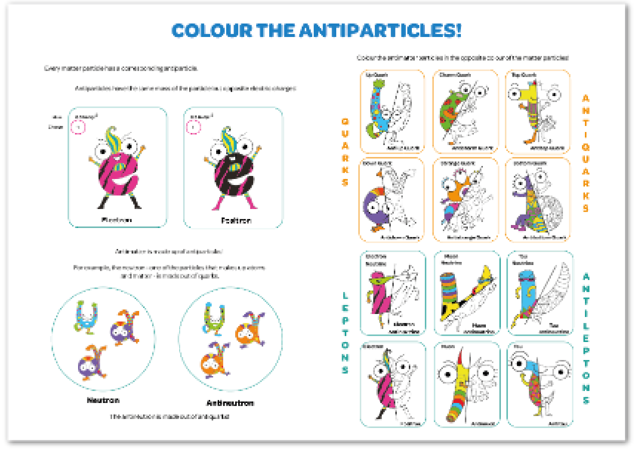


ATLAS Experiment Colouring Book



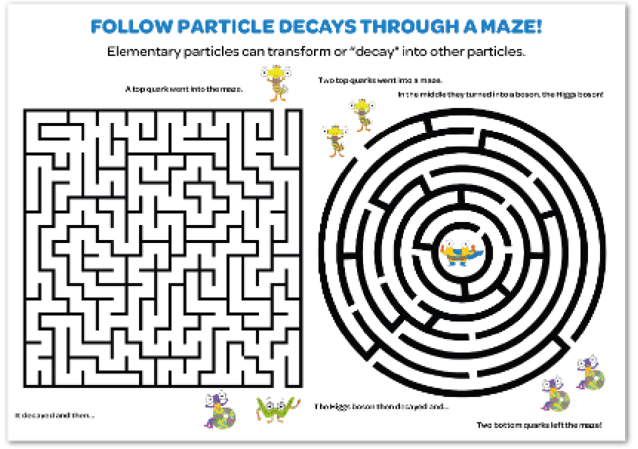
Particles of the Universe Colouring Book





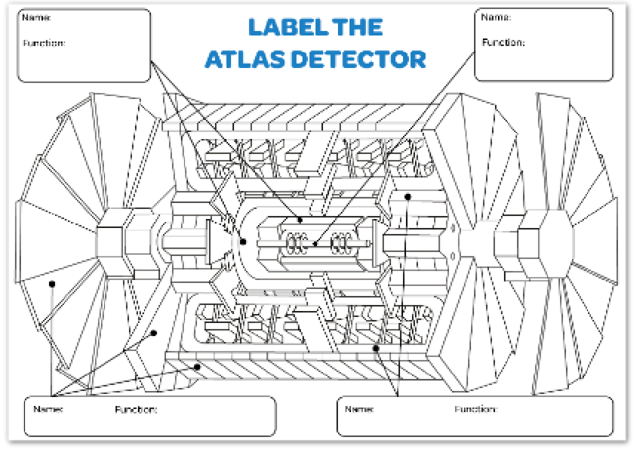
Particles vs. Antiparticles

Download in English, French, Spanish, German, Italian, Portuguese, Chinese



Follow particle decays through a maze

Download in English, French, Spanish, German, Italian, Portuguese, Chinese



Label the Detector

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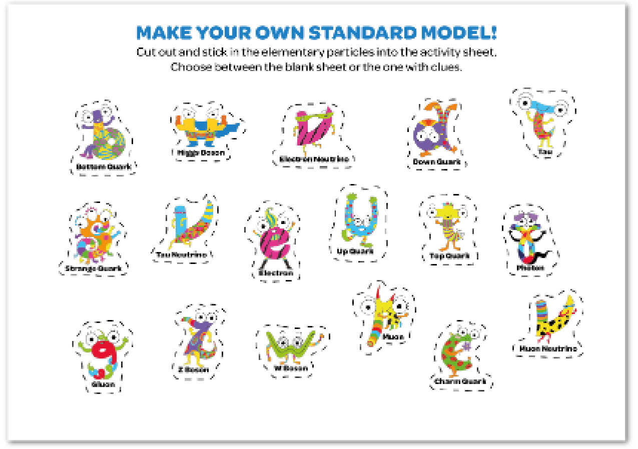
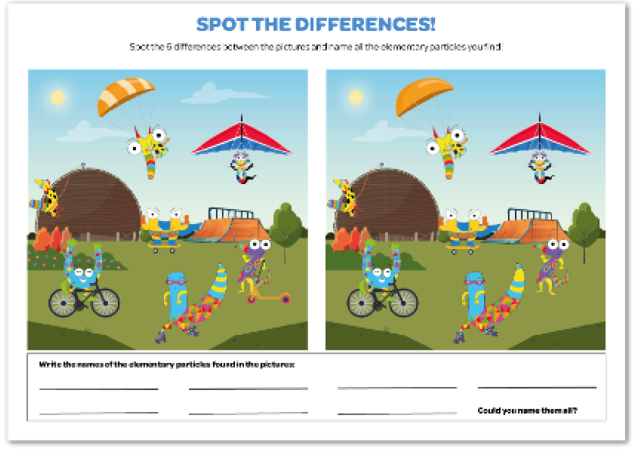


Make your own Standard Model



Spot the Differences

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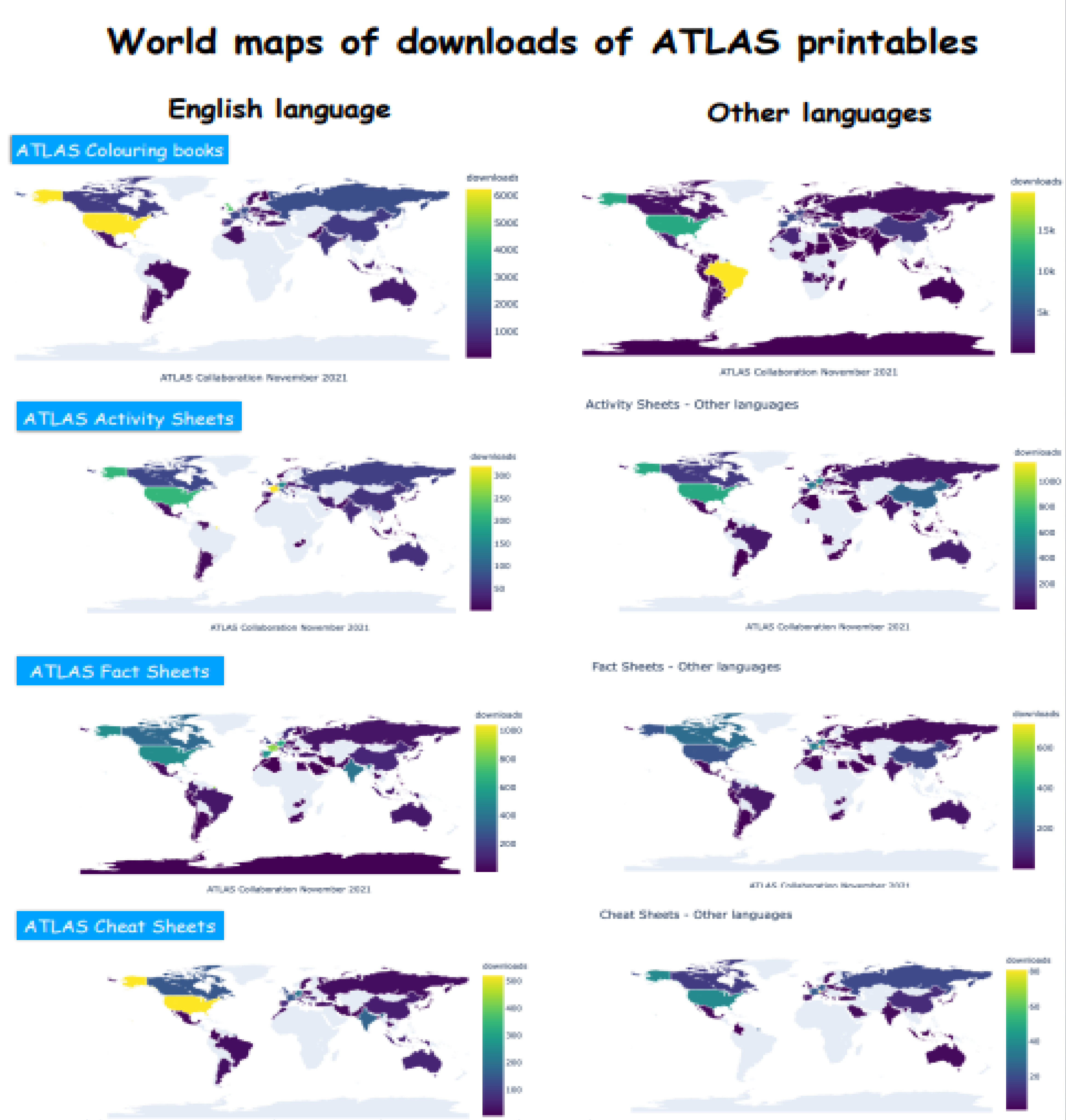
MULTILINGUALISM

- CERN & ATLAS guided tours offered in ~30 languages.
- ATLAS International MasterClasses offered in 13 languages: English, French, German, Italian, Spanish, Portuguese, Greek, Norwegian, Polish, Slovak, Czech, Danish, Turkish.
- Outreach events organized in different languages by regional research groups & individual ATLAS members from/in different countries.



http://cds.cern.ch/record/2841328/files/ATL-OREACH-PROC-2022-004.pdf

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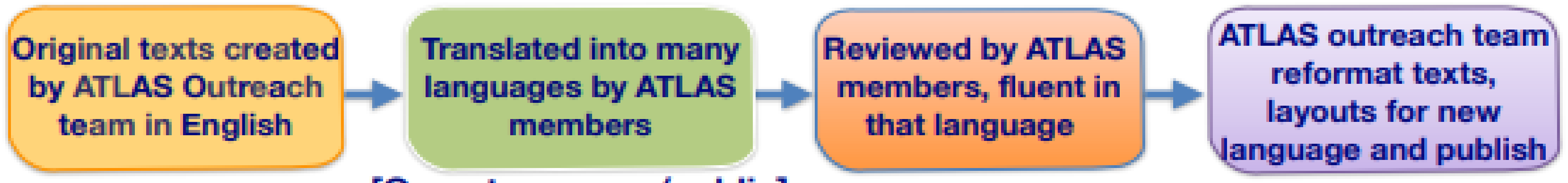
ATLAS EXPERIMENT

MULTILINGUALISM

- ATLAS educational material (written and oral) is provided in many different languages.

Translations of educational materials



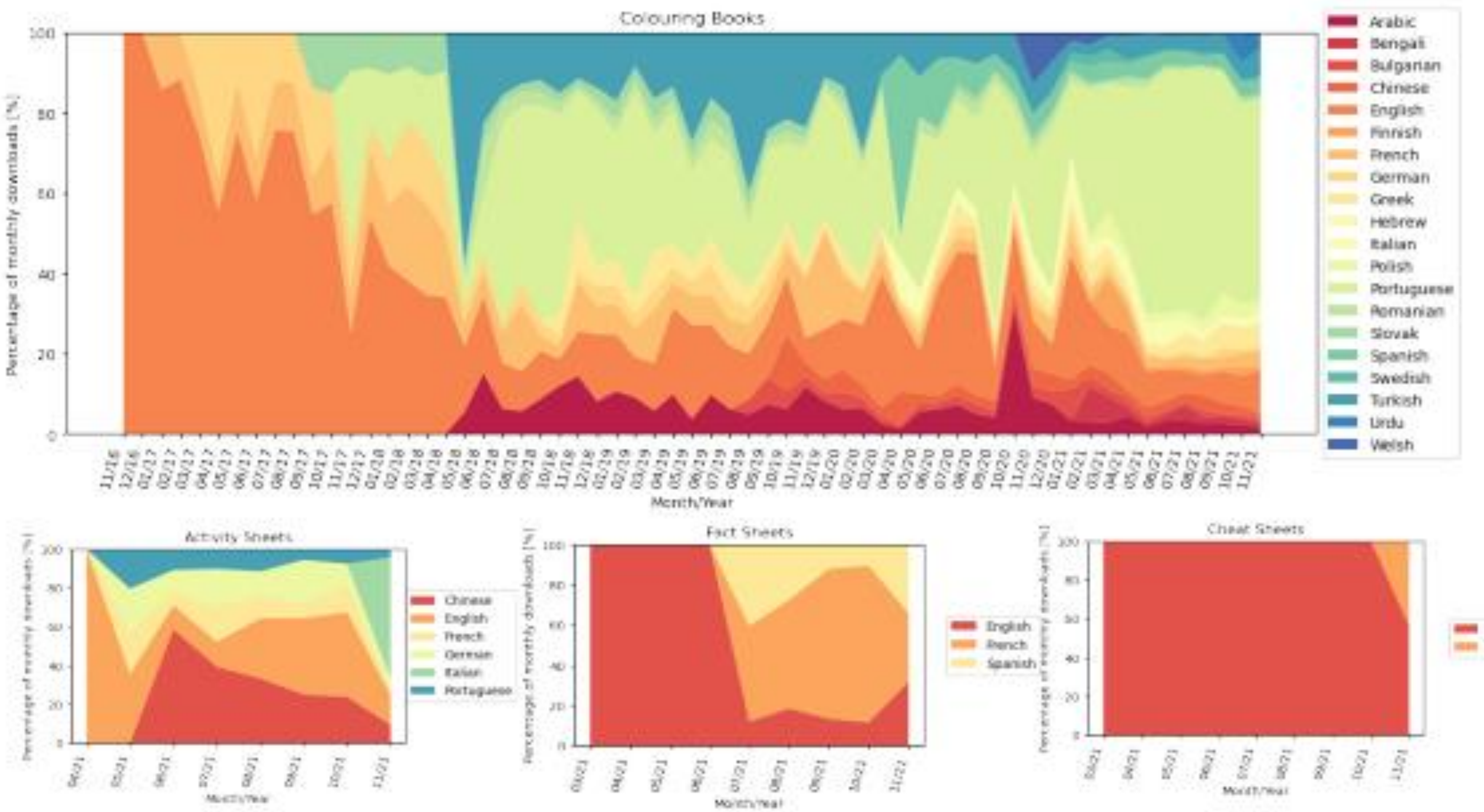
[Open to anyone/public]

Examples of ATLAS printable materials

Educational materials	Publication time	No. of languages	Languages
ATLAS Colouring book	November 2016	21	English, French, German, Spanish, Italian, Portuguese, Welsh, Romanian, Slovak, Ukrainian, Greek, Bulgarian, Russian, Hebrew, Polish, Swedish, Turkish, Urdu, Arabic, Bengali, Chinese
ATLAS Particles of the Universe	January 2020	11	English, French, German, Spanish, Italian, Greek, Chinese, Polish, Portuguese, Finnish, Urdu
ATLAS Activity Sheets (6)	April 2021	7	English, Spanish, French, Italian, German, Portuguese, Chinese
ATLAS Fact Sheets (10)	March 2021	4	English, Spanish, French, Italian
ATLAS Cheat Sheets (3)	March 2021	3	English, Spanish, French
Guide for Parents and Teachers	February 2022	2	English, Portuguese

Monthly data on translated ATLAS materials

Downloads of the ATLAS printable in different languages as a function of time :



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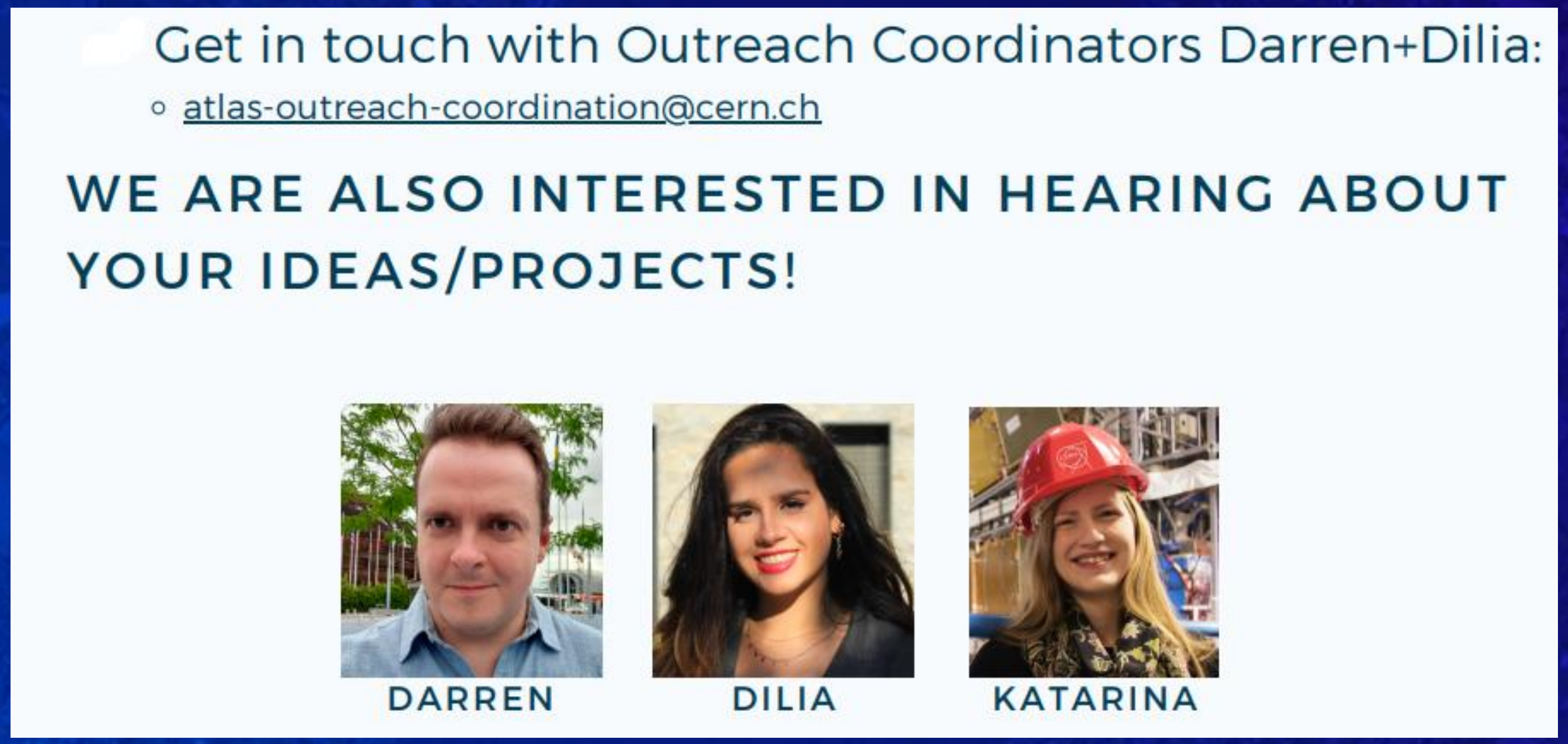
Conclusion

The ATLAS Outreach has been putting a lot of effort in engaging the classroom through:

- ATLAS On-site Visits
- ATLAS Virtual Visits
- International MasterClasses
- Printables (Cheat sheets, Fact sheets & Activity books)
- Multilingualism (activities & printables offered in many languages and in/to many countries)



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