ENGAGING ADULTS
EDUCATION AND OUTREACH FOR AGES 16+

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on behalf of the ATLAS collaboration

HELLENIC REPUBLIC
National & Kapodistrian
University of Athens

EPS-HEP 2023
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IASA

Our main outreach challenge

- How can we attract interest and provoke curiosity in HEP/ATLAS achievements?
- How can we inform the general public on basic research (and possibility get their support)?
- How can we **actively** engage audience (hands-on)?
- How can we inspire the next generation of scientists ?

Target audience

- General public
- Students in their classrooms
- STEM teachers
- University students
- Physicists
- Citizen scientist volunteers
- Media
- Policy makers

Available Resources

- Public webpage
- Masterclasses
- AVC visits
- Virtual Visits
- Open data releases
- EU outreach projects (educational scenaria)
- Social media
- Live videos
- ATLAS printables (posters,fact sheets etc)

Public Website: https://atlas.cern

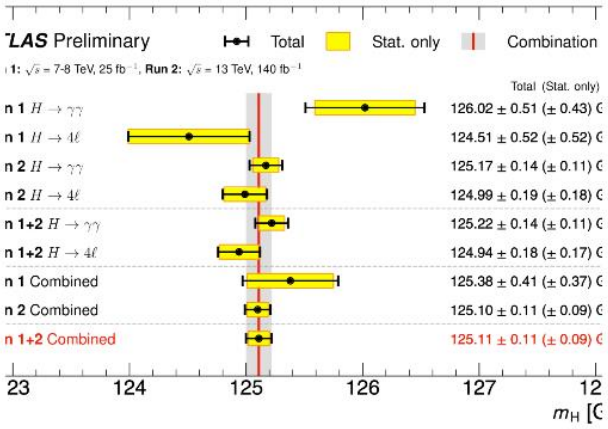
- The primary portal which gives public visibility of the ATLAS Collaboration
- Its public content communicates the goals and successes of the experiment

Public Website: https://atlas.cern

Public content: press statements (since 2012) , news (since 2008) , physics briefings (since 2014) , features, portraits, blogs and ATLAS/CERN educational resources

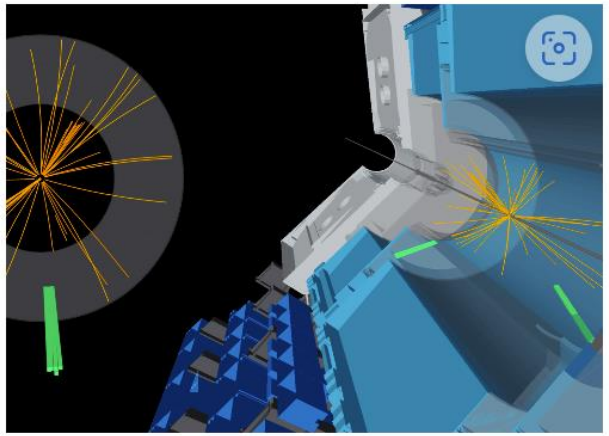
Latest News

Public Website: https://atlas.cern



ATLAS sets record precision on Higgs boson's mass

Press Statement | 21 July 2023



ATLAS measures Higgs boson mass with unprecedented precision

Physics Briefing | 21 July 2023

Summary of new ATLAS results from 2023 summer conferences

News | 17 July 2023

Feedback

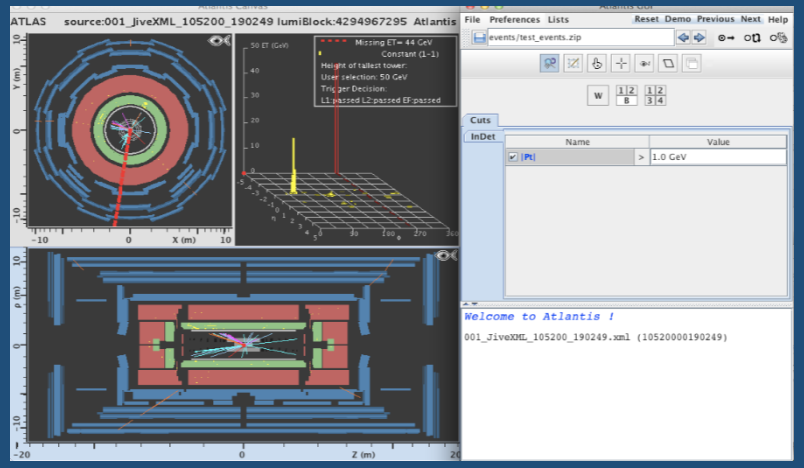
/atlas.cern/Updates/Briefing/Run2-Higgs-Mass

MASTERCLASSES FOR HIGH SCHOOL STUDENTS
(make students into scientists for a day)

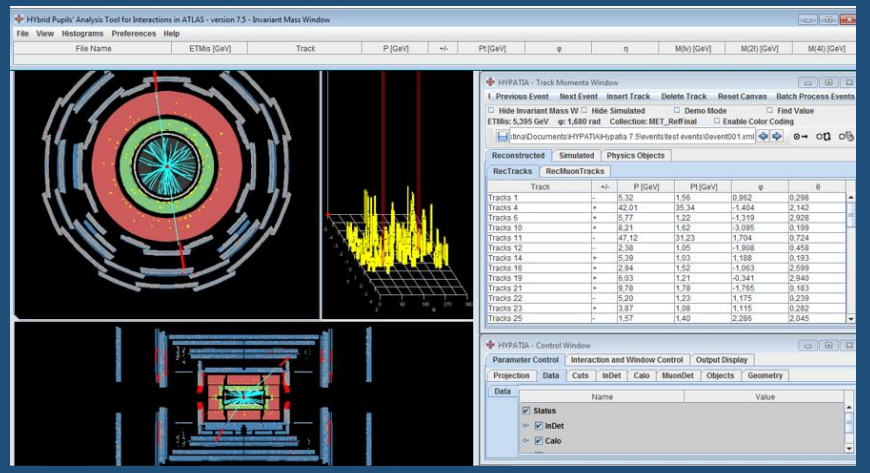
Annual **IPPOG** program now in its 19th edition (14k students/year)

➢ **ATLAS MASTERCLASSES (W and Z Path) ~50% of CERN LHC IMCs**

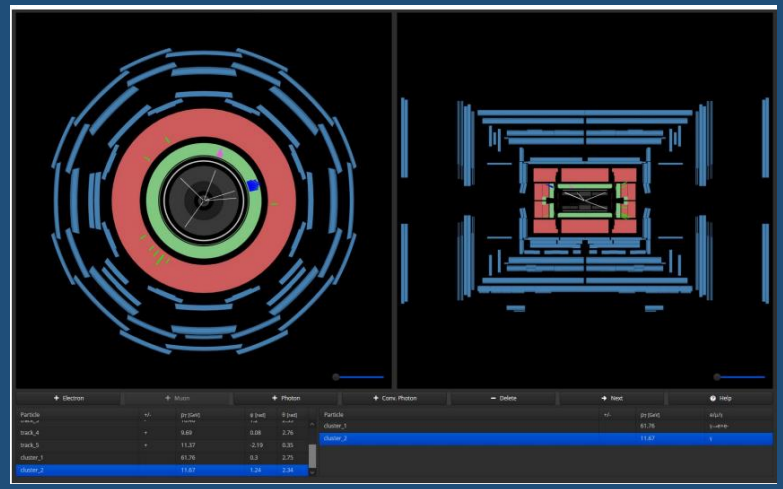
W Path-MINERVA



Z Path-HYPATIA offline



Z Path-HYPATIA online



Also many mini-masterclasses in schools

ATLAS NEW VISITOR NEW CENTER (AVC)

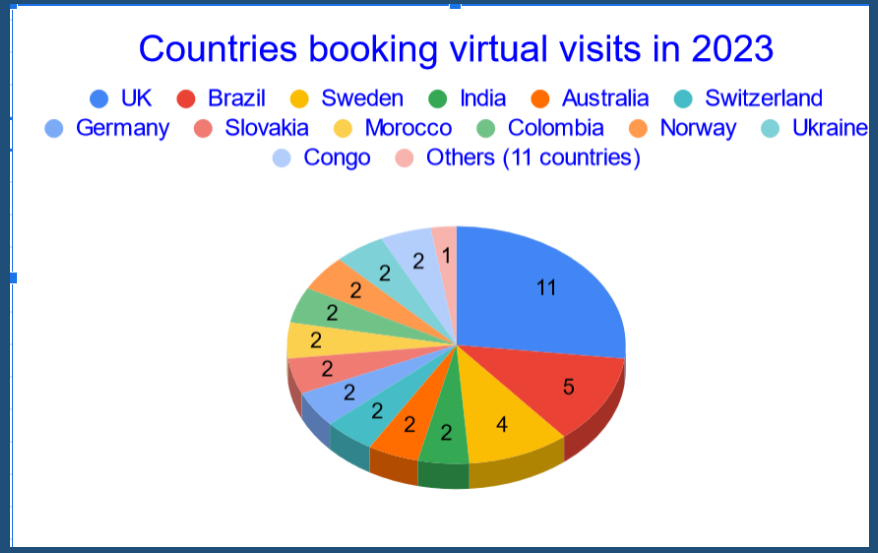
Point 1 (next to Science Gateway)

- Key part of the CERN Official Visit itinerary and **most popular visitor site**
- Many interactive screens and exhibitions
- Windows that can be made transparent or opaque

ATLAS VIRTUAL VISITS (1/2)

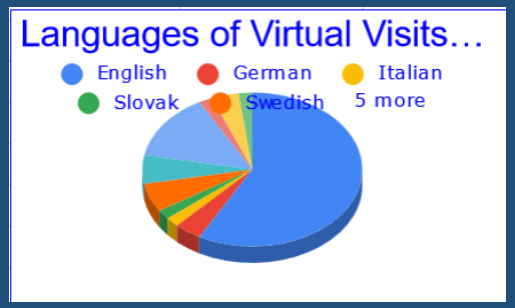
- Students/public can experience the excitement without moving from their classrooms
- Remote connection to AVC or ATLAS cavern (when open/available)
- Open visits on any requests (schools, conferences, festivals etc)
- Often live-streamed on public media

ATLAS VIRTUAL VISITS (2/2)



Some statistics for 2023 (to-date)

- Visits 50 -> **half from the cavern** (121 in 2022)
- From 14 countries (36 in 2022)



FEEDBACK:
Three girls' high-schools in Sri Lanka
on 18-11-2022 @ 8 a.m.
(right after the floods!)

ATLAS OPEN DATA (1/2)

http://opendata.atlas.cern

An educational platform providing easy access to the REAL ATLAS data, software and tools with documentation in the form of step-by-step instructions for users (mainly high-school and undergrad students)

Consists of two releases

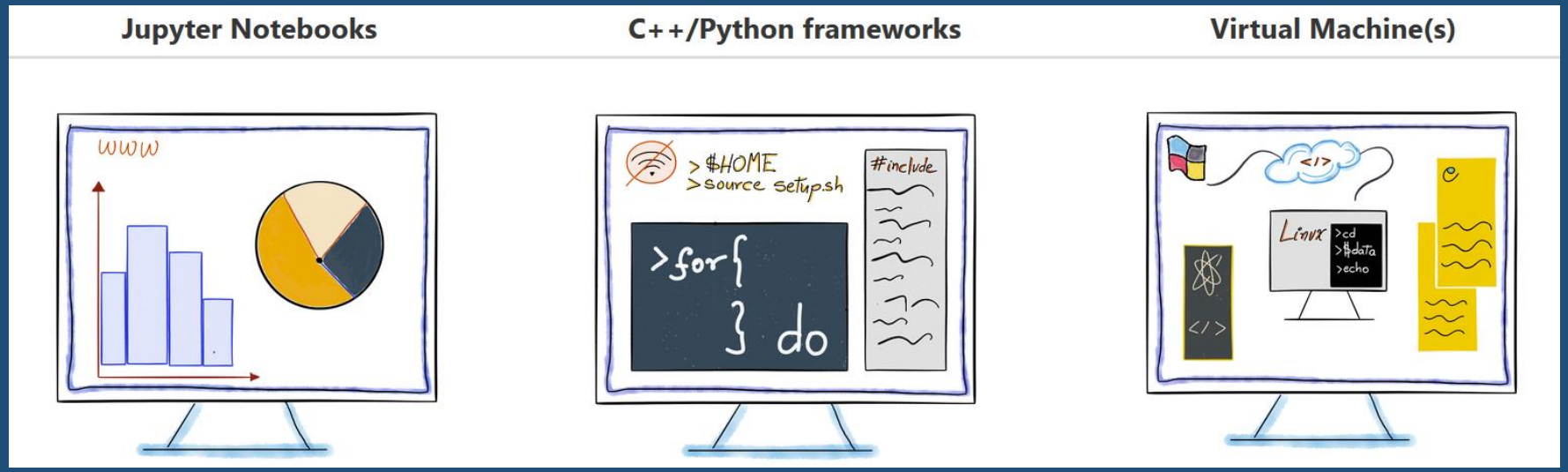
- 1 fb^{-1} of 8 TeV proton-proton data (2016)
- 10 fb^{-1} of 13 TeV proton-proton data (2020) [used by REINFORCE demonstrator]
- Both with accompanying simulation datasets
- Tools and software of varying technical difficulty to analyse the data

New, enhanced 13 TeV data release, coming in 2024

ATLAS OPEN DATA (2/2)

Tools and documentation: beginner to complex (examples+tutorials available)

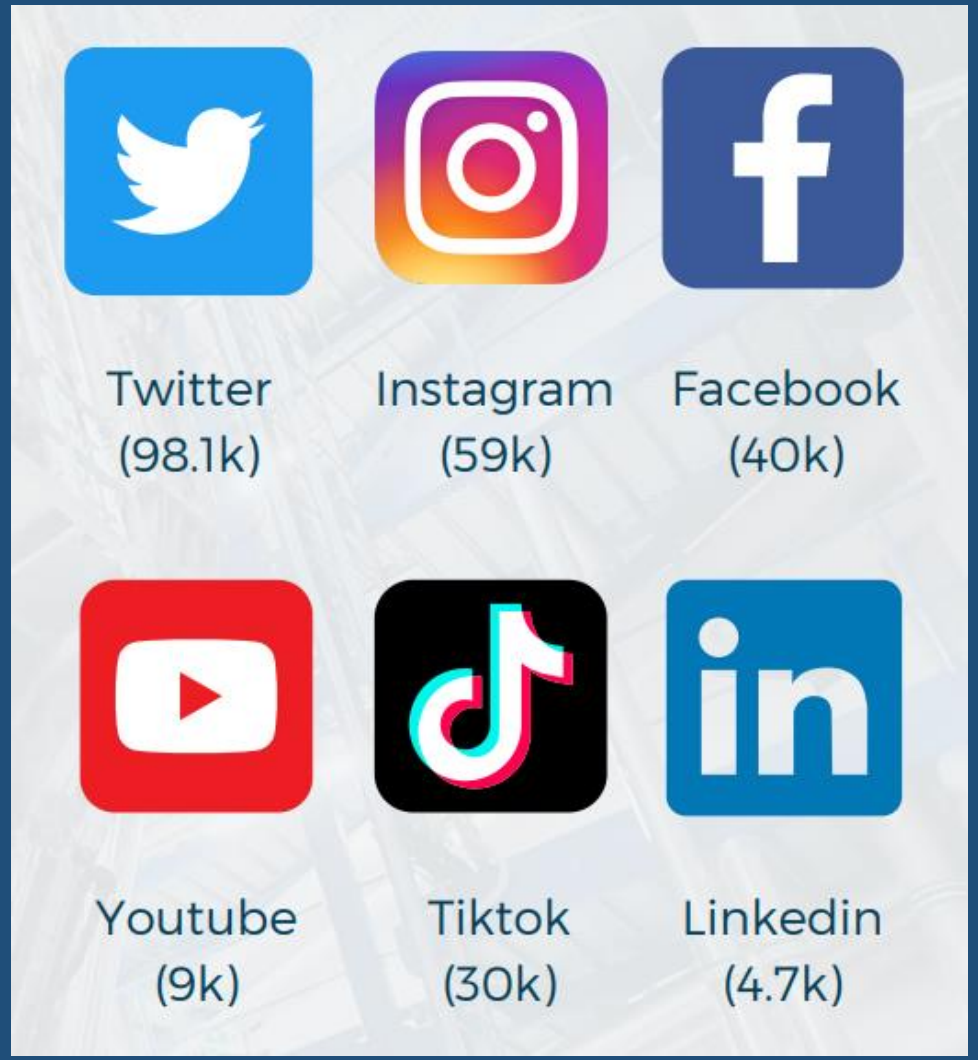
- Browser-based histogram analysis
- Visual event-display analysis (HYPATIA)
- Jupyter notebooks (Python/C++)
- Docker containers, Virtual Machines and Cloud computing support



Many Institutions used it over the years for high-school students and university courses/labs (HYPATIA available on batch mode used by U of Athens)

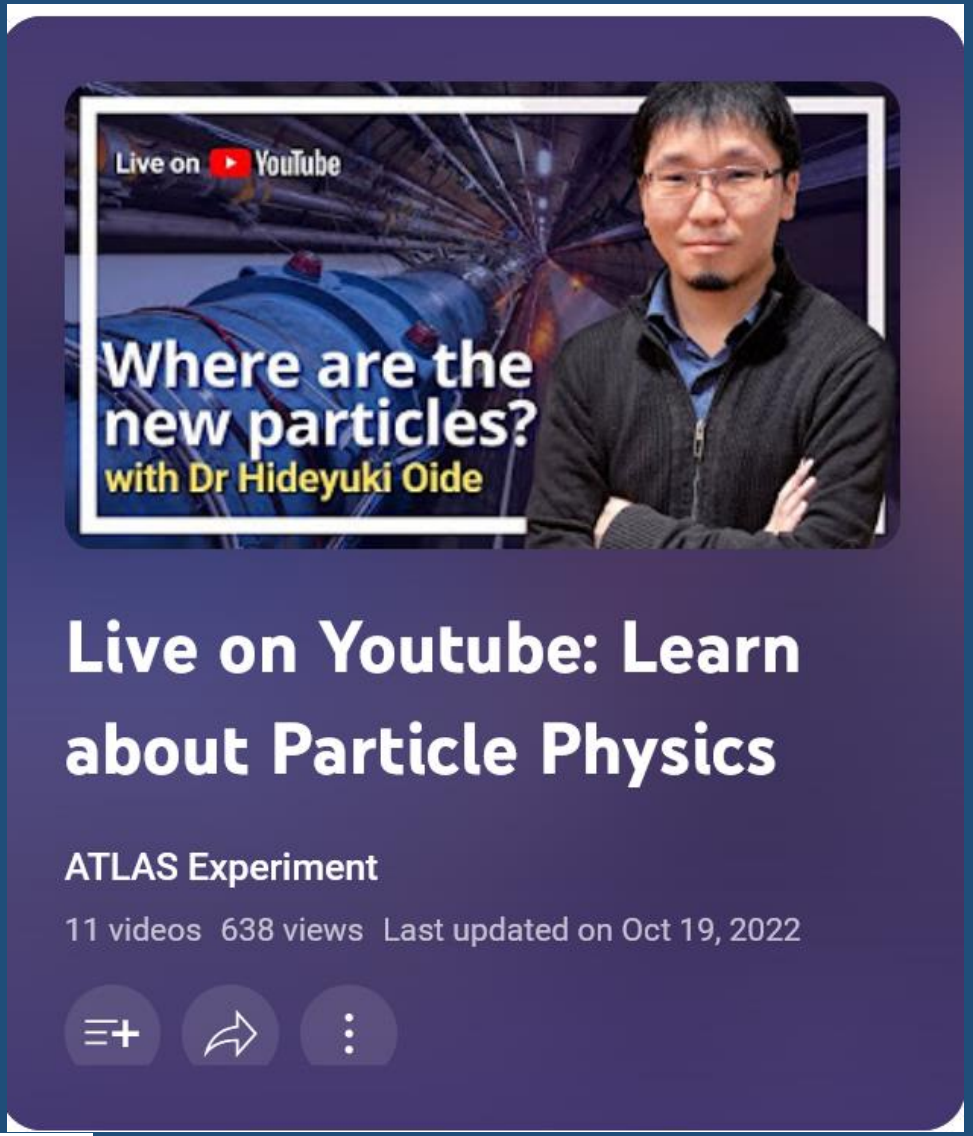
ATLAS on SOCIAL MEDIA

Leading LHC experiment in all social media platforms



- On Linkedin (company & group profiles)
- CERN Alumni platform.
- Accessing newer social media like Threads, Mastodon, Hive, Flickt etc

ATLAS Live Videos on Youtube (long-form)



- Excellent audience response
- Increased audience retention

Recent lives include ACR operations (Run-3 start), underground tours, and lectures all with interactive public Q&A

The ATLAS Outreach team

Big thanks to the ATLAS core team for all the material provided for this talk

- Lots of different ATLAS efforts to engage diverse groups of people
- More on M. Moreno's talk on Wednesday

Contact People: outreach coordinators: Dilia Portillo & Darren Price comms/social media/colouring book: Katarina Anthony virtual visits: Muhammad Alhroob, open data: Kate Shaw, fact sheets: Ana Maria Rodriguez, cheat sheets: Elise Le Boulicaut, Valerie Buxbaum, website: Steven Goldfarb, visitor centre: Steven Goldfarb, Katarina Anthony

Back-up

MORE ON ATLAS OPEN DATA

- Real and simulated data stored in a “ROOT ntuple format”
- Calibrated and simplified information about the reconstructed high level objects
- Downloadable datasets and analysis codes
- Simplified information for taking systematic uncertainties into account on the properties of the objects
- Dataset identifiers
- Trigger (boolean) variables
- Kinematic variables
- Sources of systematic uncertainties
- Generated with the help of one of ATLAS’s “analysis frameworks”

Future plans

- Change of ATLAS analysis data formats
- DAOD_PHYSLITE format, meant for LHC Run3 and HL-LHC ATLAS analyses, investigated as the starting point for the next ATLAS Open Data release
- An upcoming data release is in planning
- Data formats other than ROOT ntuples being considered
- To benefits institutions that have computing facilities and just need infrastructures
- Both open releases of ATLAS’s data proved very successful in outreach

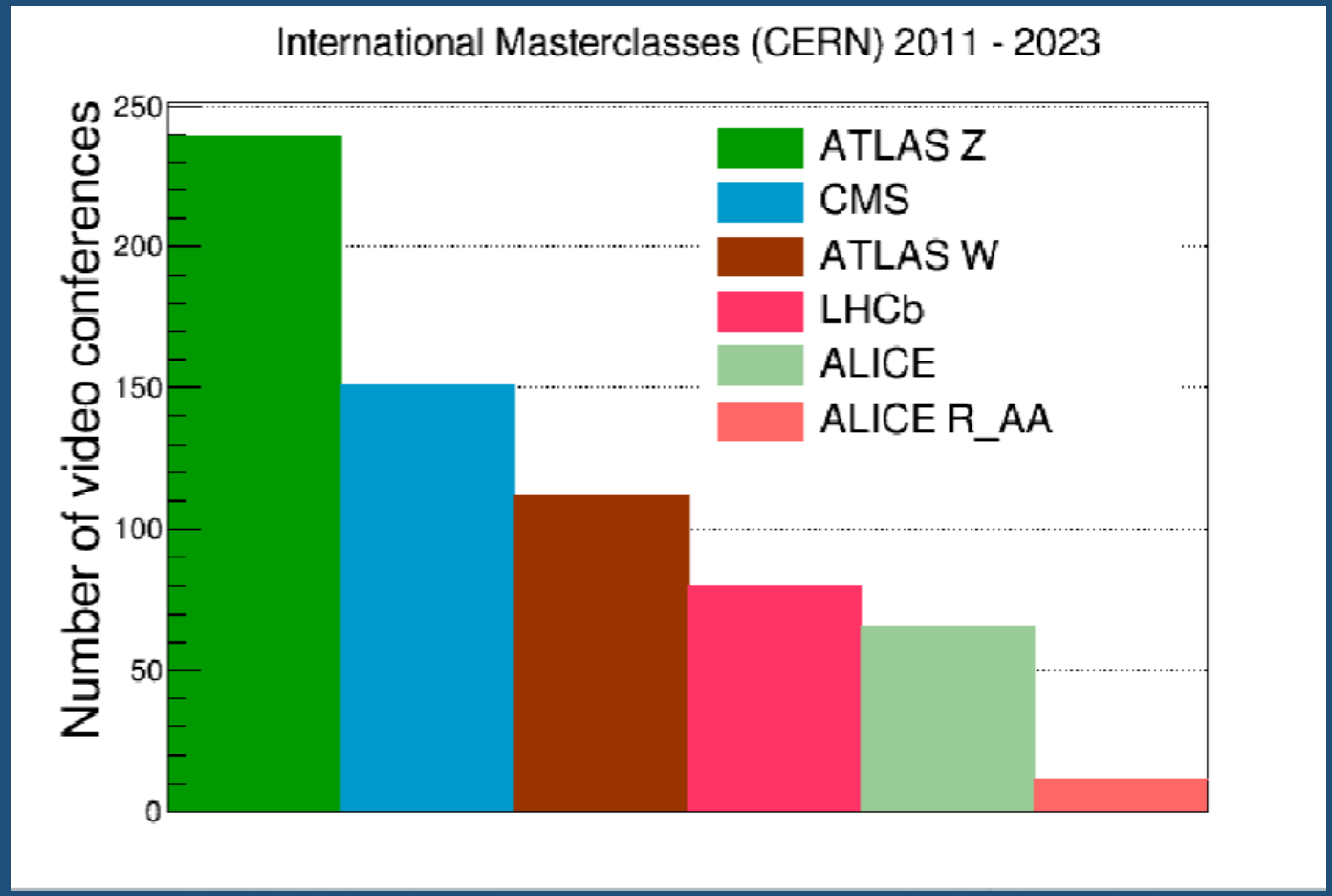
✓ Great help in involving students from countries in various geographic locations

➔ Also countries that are not part of the ATLAS Collaboration

EU educational content/scenaria (since 2008)

Resources created on the framework of the projects:

- Learning with ATLAS@CERN, http://www.learningwithatlas-portal.eu/
- Discover the COSMOS, http://portal.discoverthecosmos/.eu
- PATHWAY IBSE Project, http://www.pathway-project.eu/
- Go-lab, http://www.go-lab-project.eu/
- Inspiring Science education, http://inspiring-science-education.org/
- CREATIONS project, http://creations-project.eu/
- The Frontiers Project, http://www.frontiers-project.eu/
- REINFORCE, http://www.reinforceeu.eu/


International Masterclasses (CERN) 2011 - 2023
Number of video conferences
250
200
150
100
50
0
ATLAS Z
CMS
ATLAS W
LHCb
ALICE
ALICE R_AA