



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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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)

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

A screenshot of the ATLAS Experiment public website. The header is blue with the ATLAS logo on the left and navigation links "Collaboration Site" and "Physics Results" on the right. A central banner image shows the interior of the ATLAS detector with the text "The ATLAS Experiment" overlaid in a dark blue box. Below the banner, there are two columns of text: "Push the frontiers of knowledge" and "Global Collaboration". A vertical "Feedback" button is on the right side of the banner image.

Collaboration Site | Physics Results

ATLAS EXPERIMENT

The ATLAS Experiment

Feedback

Push the frontiers of knowledge

ATLAS is a general-purpose particle physics experiment at the [Large Hadron Collider](#) (LHC) at [CERN](#). It is designed to exploit the full discovery potential of the LHC, pushing the frontiers of scientific knowledge. ATLAS' exploration uses

Global Collaboration

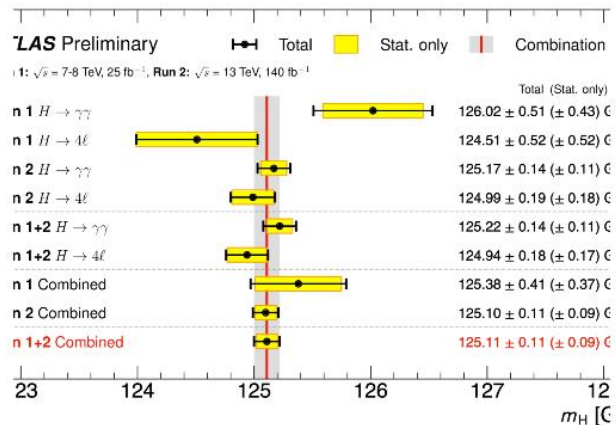
ATLAS is a collaboration of physicists, engineers, technicians, students and support staff from around the world. It is one of the largest collaborative efforts ever attempted in science, with over 5500 members and almost 3000 scientific authors. The success of ATLAS relies on the

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

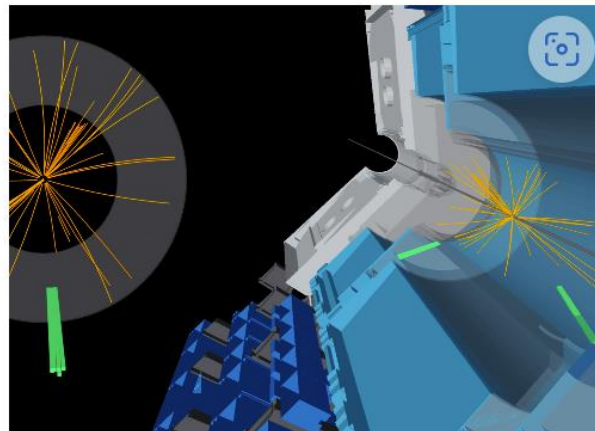
Latest News

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



SUMMER CONFERENCES

LEPTON PHOTON 17 - 21 JUL MELBOURNE, AUSTRALIA

EPS-HEP 21 - 25 AUGUST HAMBURG, GERMANY

Summary of new ATLAS results from 2023 summer conferences

News | 17 July 2023

Feedback

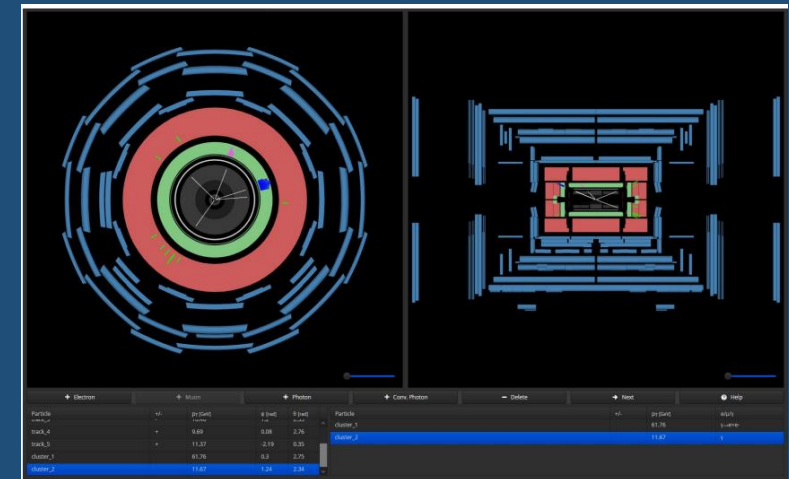
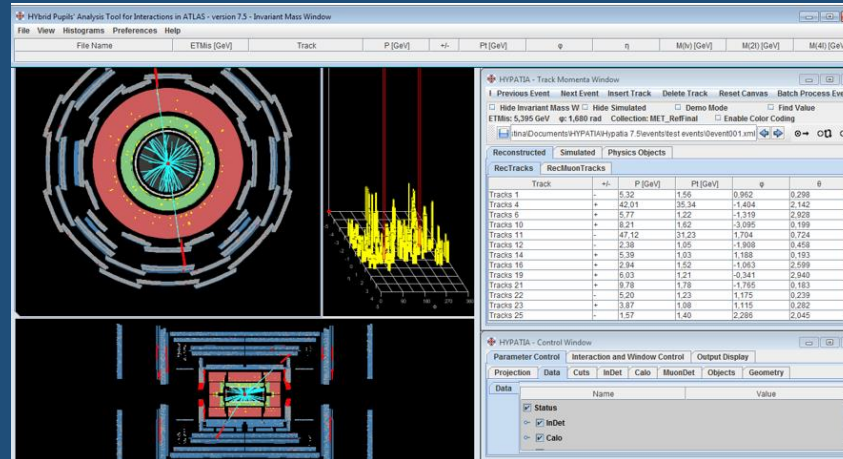
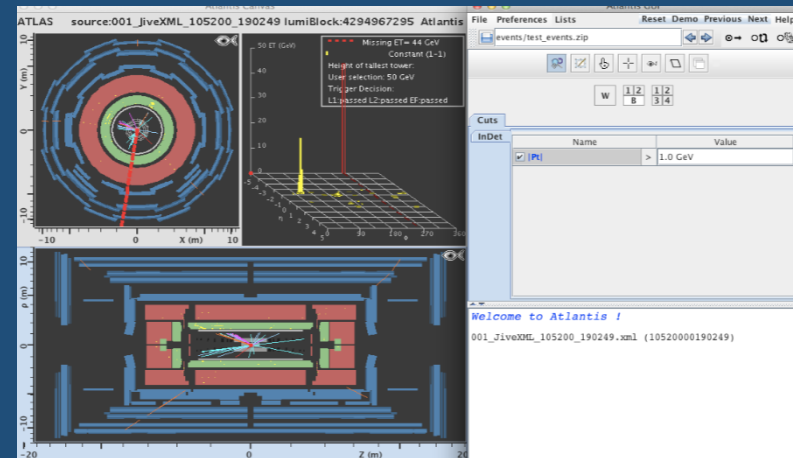
MASTERCLASSES FOR HIGH SCHOOL STUDENTS (make students into scientists for a day)

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

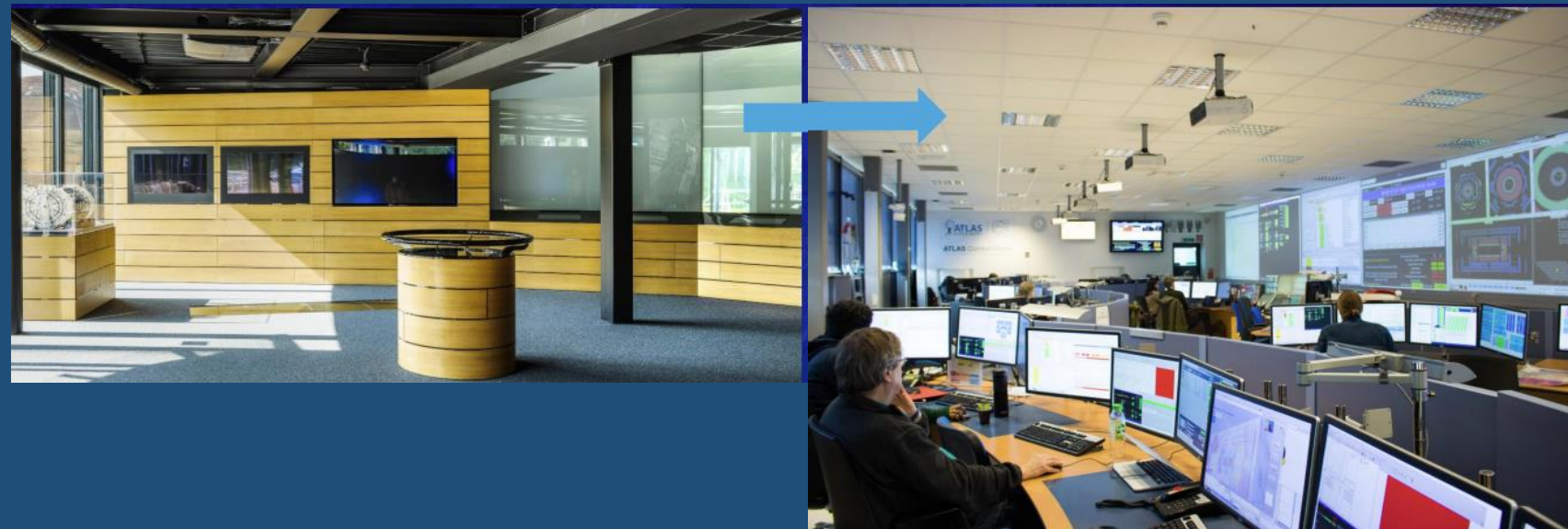
Z Path-HYPATIA online



Also many mini-masterclasses in schools

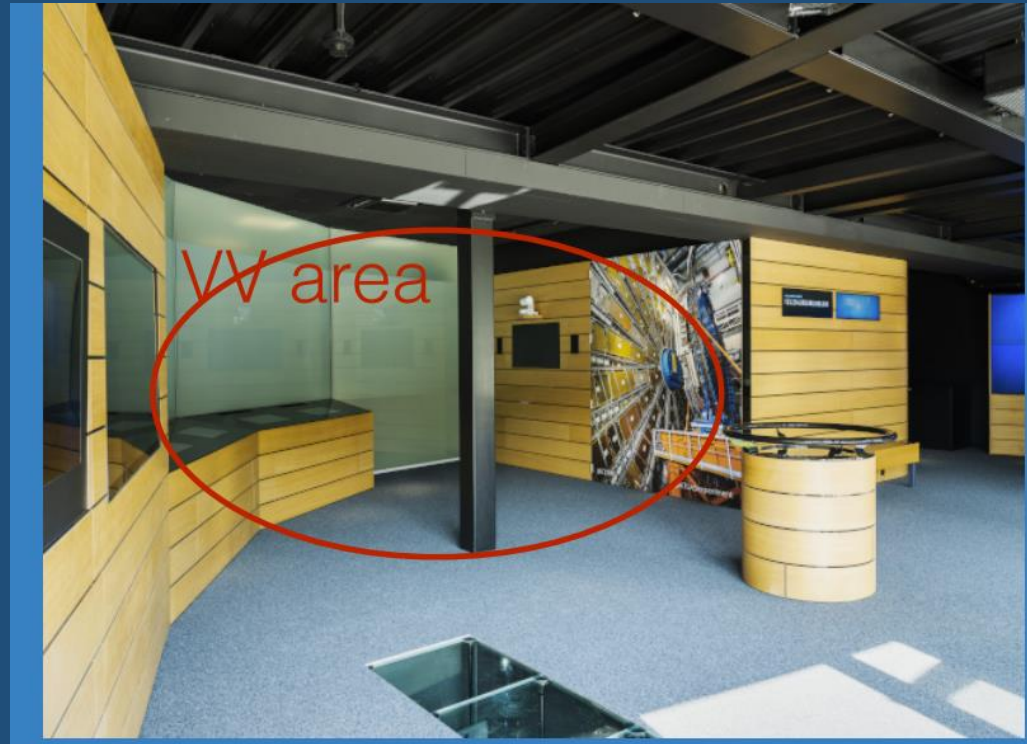
ATLAS NEW VISITOR NEW CENTER (AVC) *Point 1 (next to Science Gateway)*

- 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)

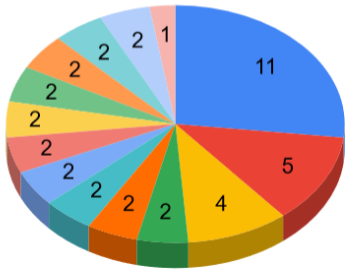
- Students/public can experience the excitement without moving from their classrooms
- Remote connection to AVC or ATLAS cavern (when open/available)
- Open visits on any requests (schools, conferences, festivals etc)
- Often live-streamed on public media



ATLAS VIRTUAL VISITS (2/2)

Countries booking virtual visits in 2023

- UK
- Brazil
- Sweden
- India
- Australia
- Switzerland
- Germany
- Slovakia
- Morocco
- Colombia
- Norway
- Ukraine
- Congo
- Others (11 countries)

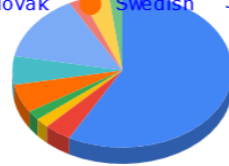


Some statistics for 2023 (to-date)

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

Languages of Virtual Visits...

- English
- German
- Italian
- Slovak
- Swedish
- 5 more



FEEDBACK:

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

We would like to express our sincere gratitude for enlightening our young minds by giving such an rare opportunity to visit CERN. We value that moment for ever.

Hillwood College Kandy
Sri Lanka
2022-11-16

CERN
Virtual Tour






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

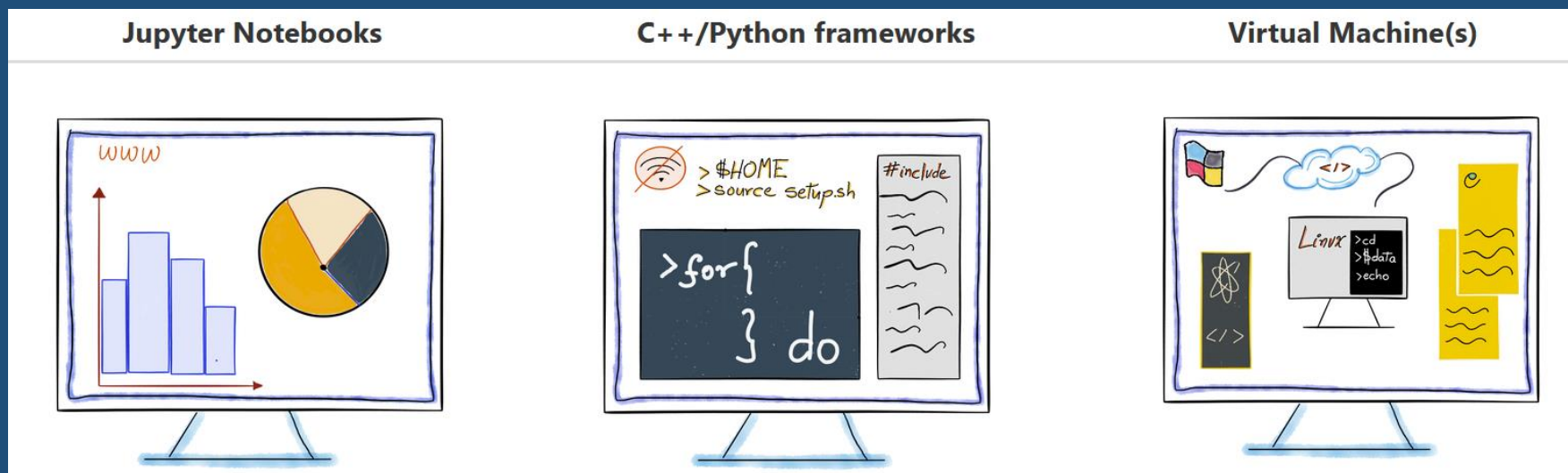
- 1 fb⁻¹ of 8 TeV proton-proton data (2016)
- 10 fb⁻¹ of 13 TeV proton-proton data (2020) [used by REINFORCE demonstrator]
- Both with accompanying simulation datasets
- Tools and software of varying technical difficulty to analyse the data

New, enhanced 13 TeV data release, coming in 2024

ATLAS OPEN DATA (2/2)

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

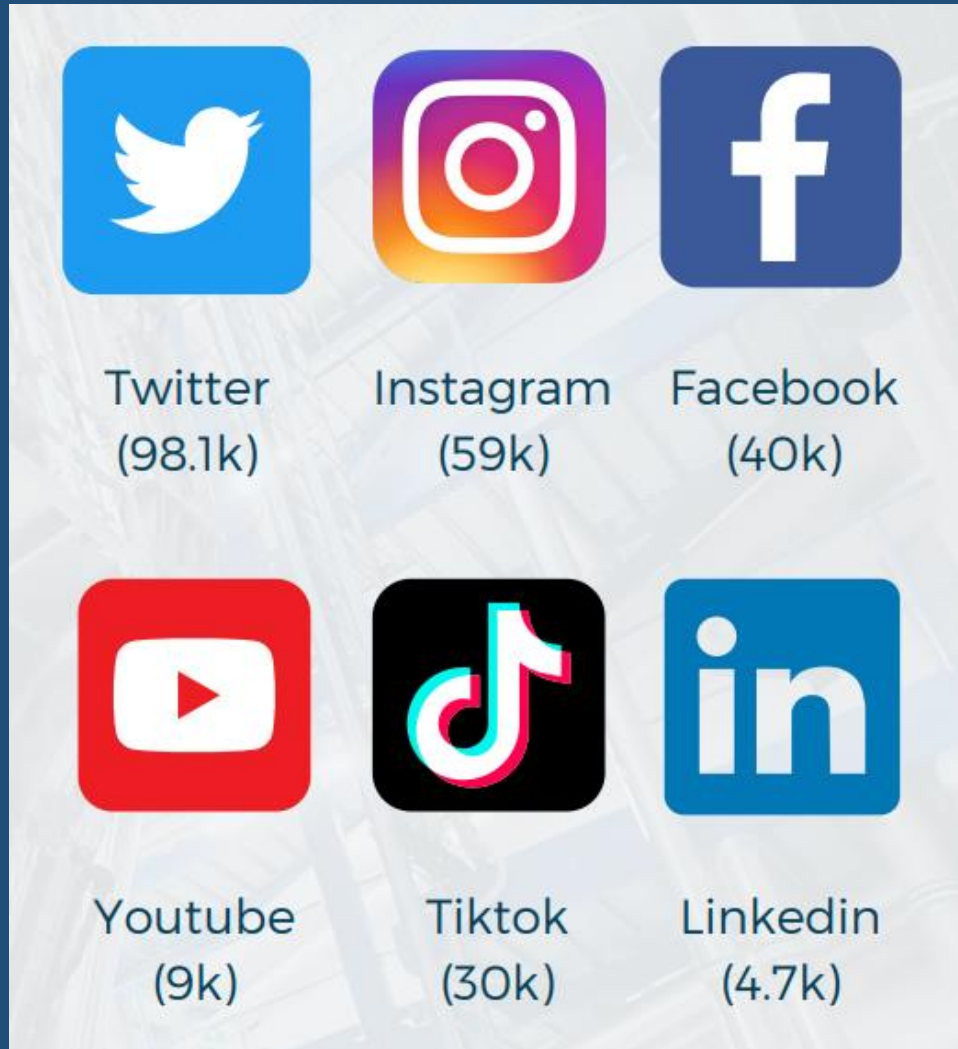
- Browser-based histogram analysis
- Visual event-display analysis (HYPATIA)
- Jupyter notebooks (Python/C++)
- Docker containers, Virtual Machines and Cloud computing support



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, Flickr etc

ATLAS Live Videos on Youtube (long-form)



Live on Youtube: Learn about Particle Physics

ATLAS Experiment

11 videos 638 views Last updated on Oct 19, 2022



- 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

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

