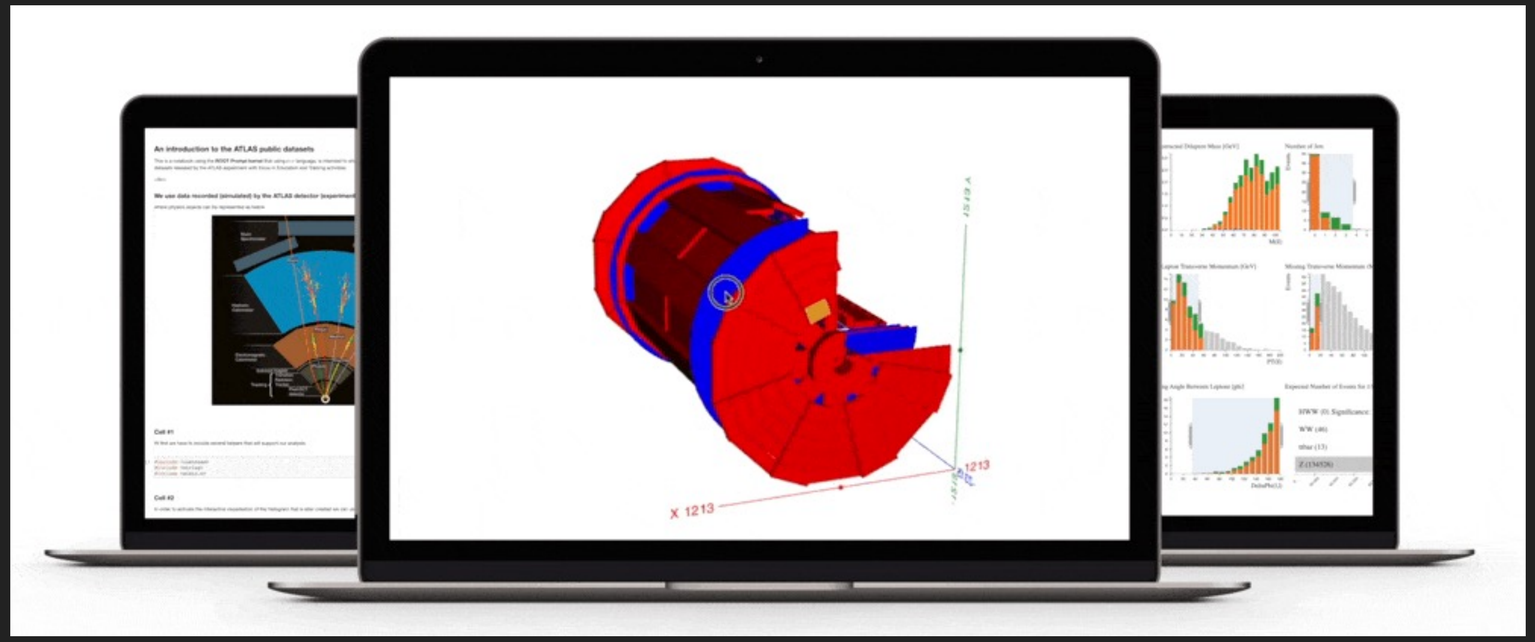


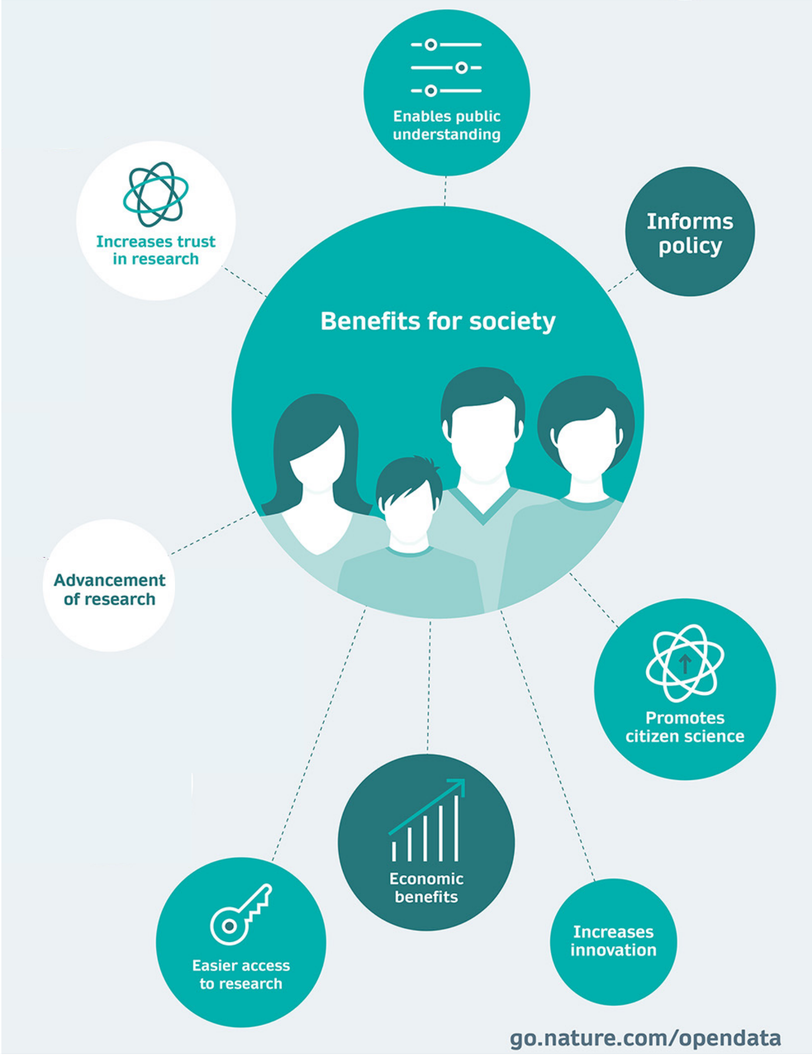
Meirin Oan Evans, on behalf of the ATLAS Collaboration

ATLAS Open Data: co-creation of educational resources

a genuinely collaborative approach for the creation of educational resources


STUDENTS
ATLAS OPEN DATA
EDUCATIONAL RESOURCES

ATLAS Open Data: co-creation of educational resources



- Enables public understanding
- Promotes citizen science
- Easier access to research
- Increases trust in scientists

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ATLAS Open Data: co-creation of educational resources

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ATLAS Open Data: co-creation of educational resources

Tags

Home About Apps Data News/Blog Software EN

ATLAS Open Data

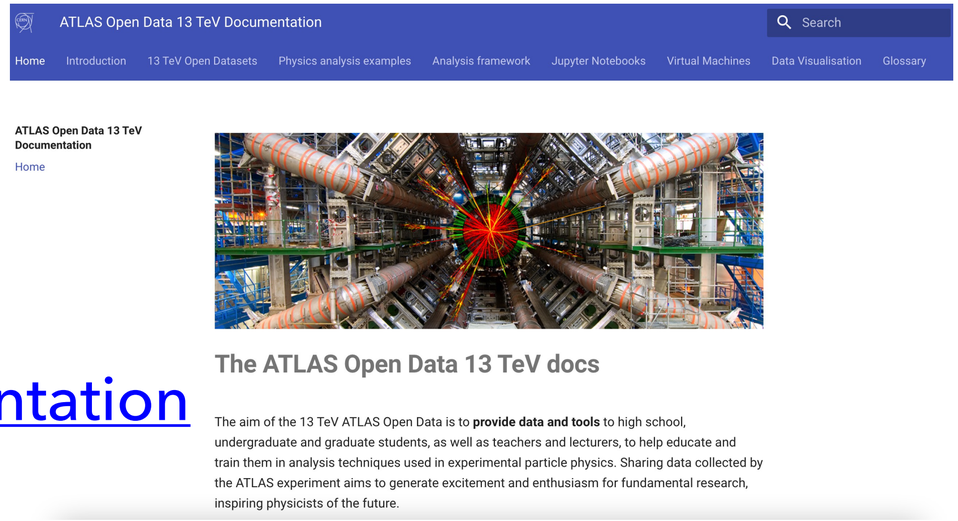
An Educational project in High Energy Physics

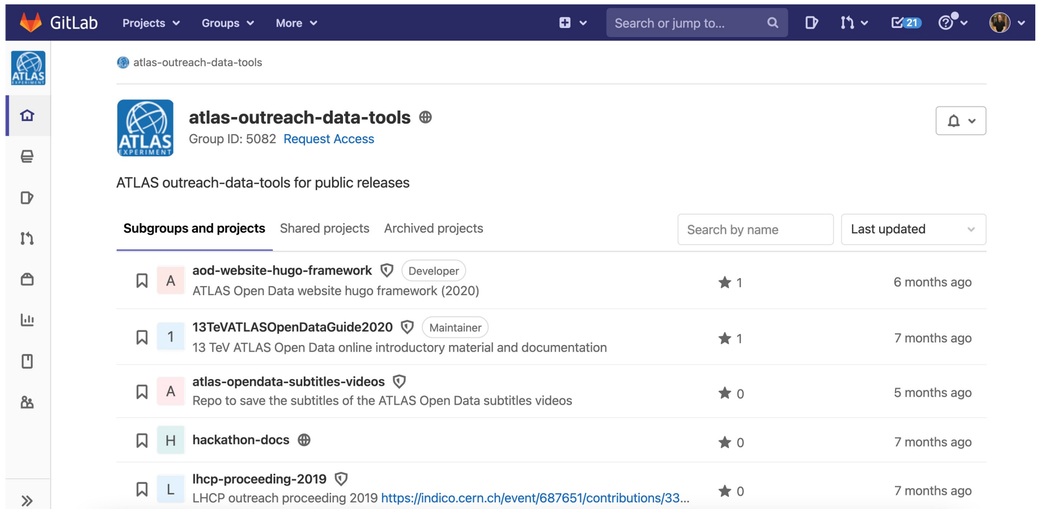
documentation

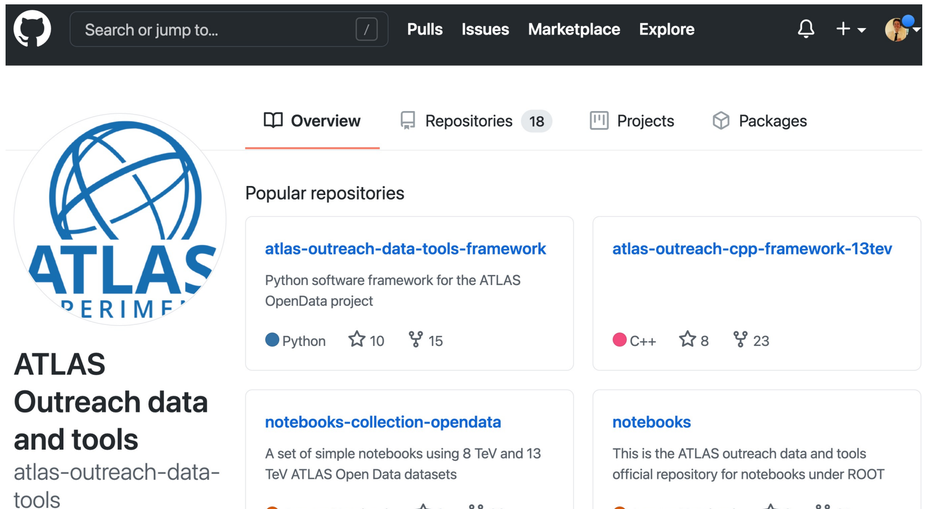
website

GitHub

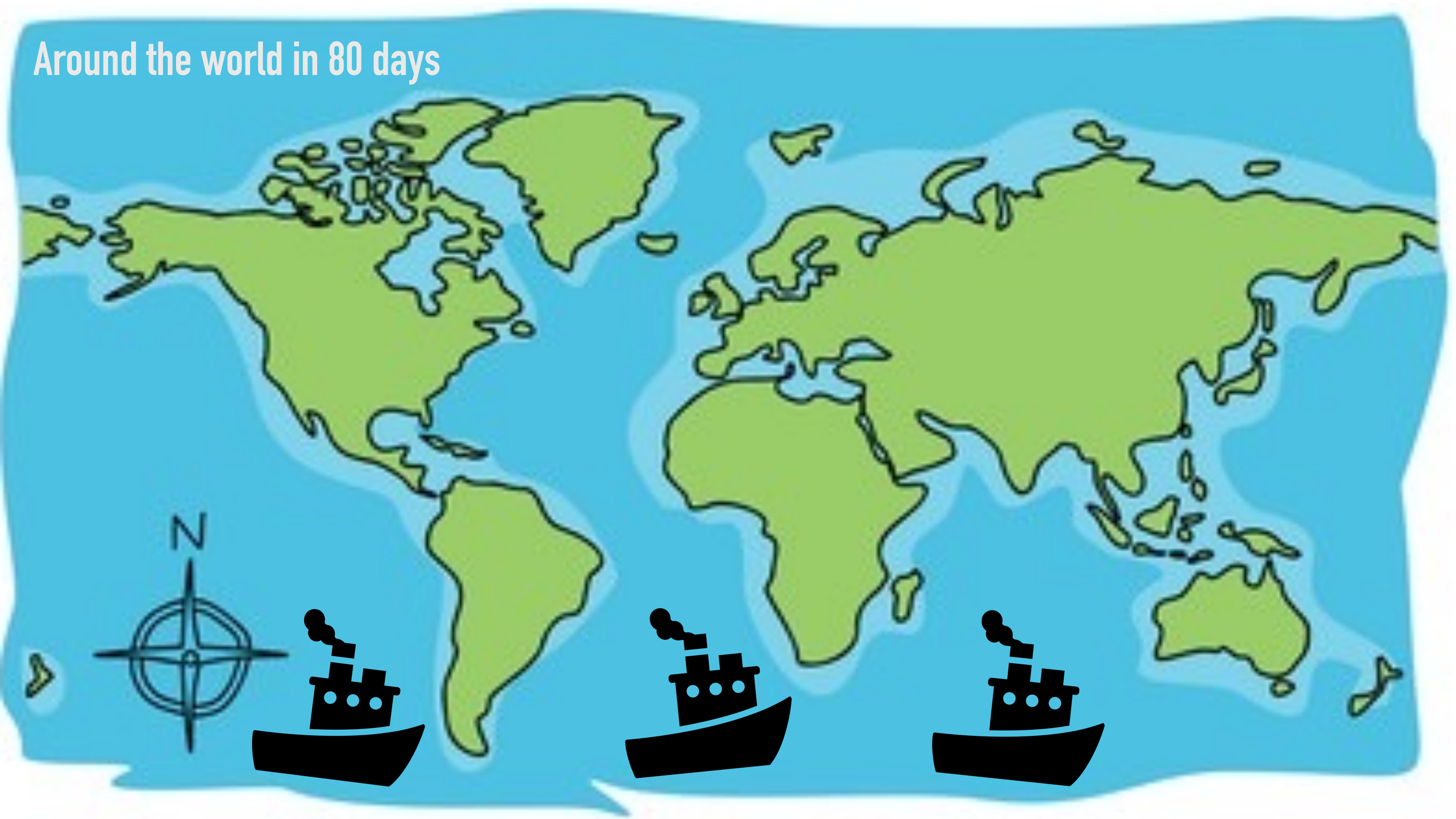
GitLab







Around the world in 80 days

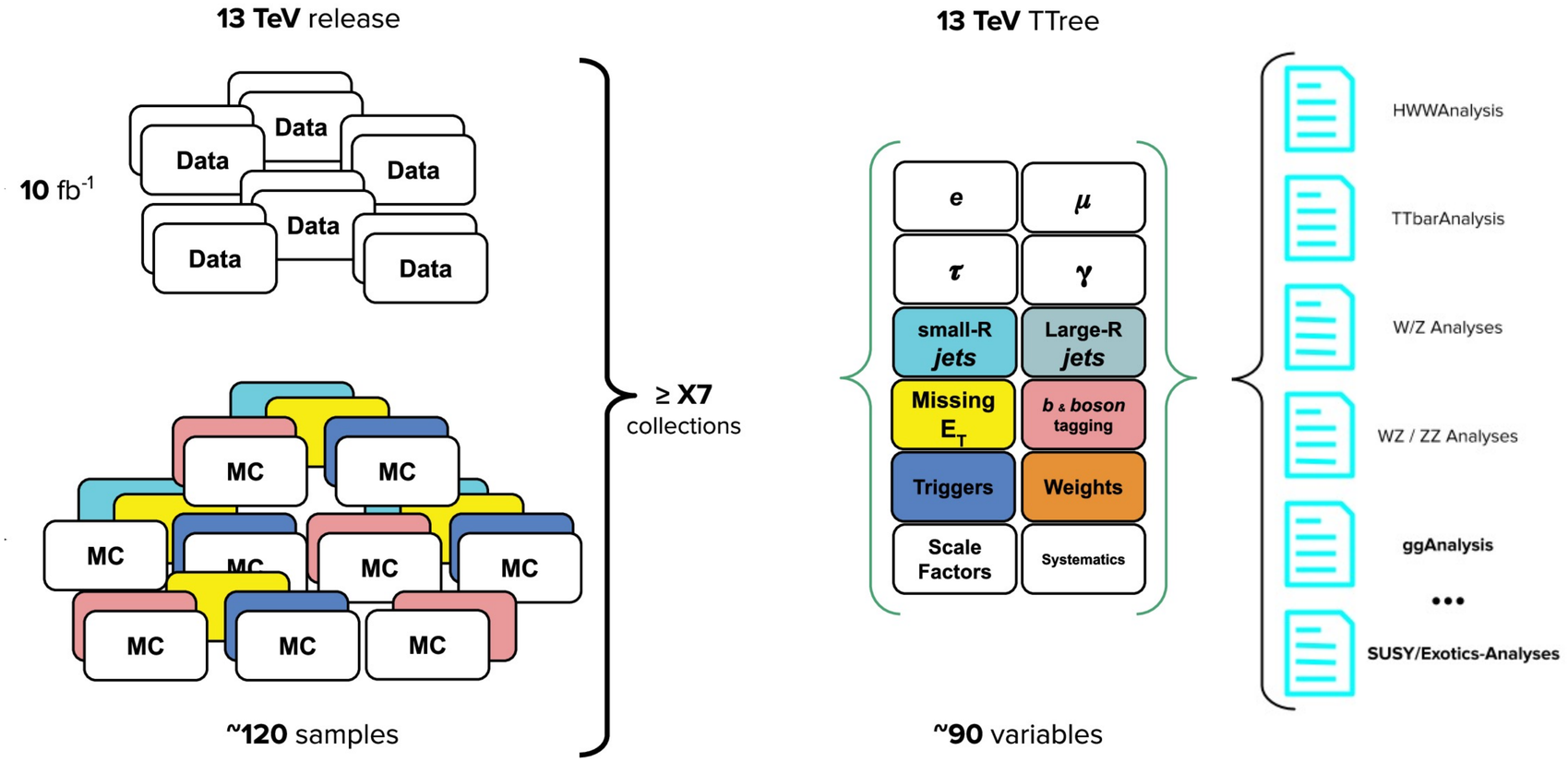


Around the world in ~~80 days~~ 15 minutes


Meirin
Even
N

The data

Dataset creation



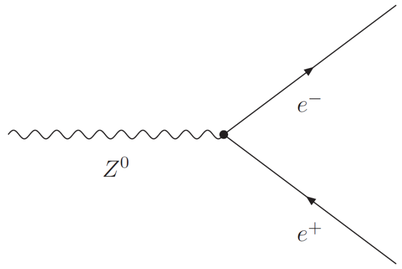

N
Ya-Feng

The code

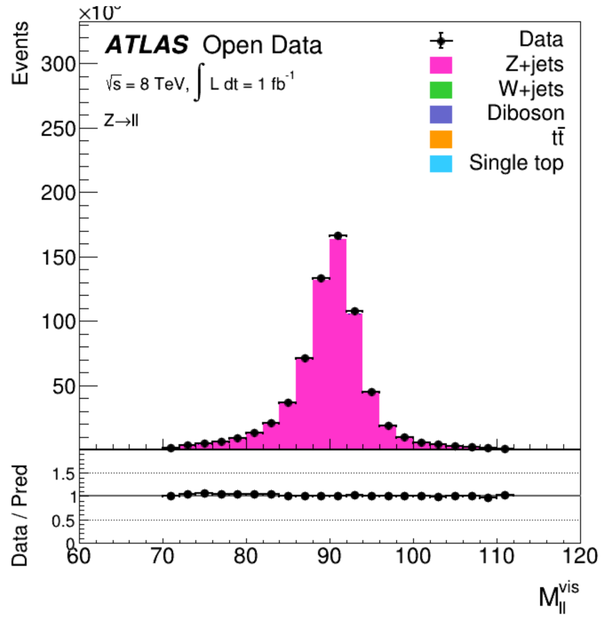
C++ software for visualisation and physics analysis

- 7 ROOT analysis examples to accompany open data release
- To educate and train others

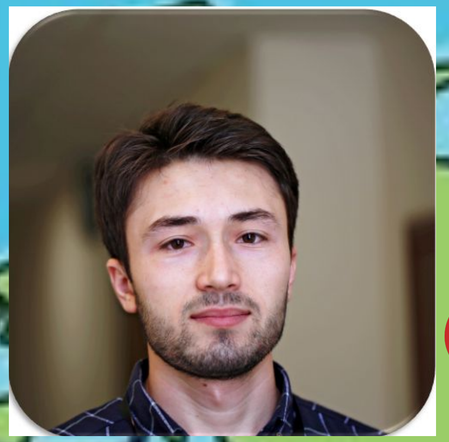
Z analysis



- Exactly two good leptons with $p_T > 25$ GeV;
- Leptons have opposite charge;
- Leptons have same flavour;
- $|m_{\ell\ell} - m_Z| < 20$ GeV with $m_Z = 91.18$ GeV.



Shodruz



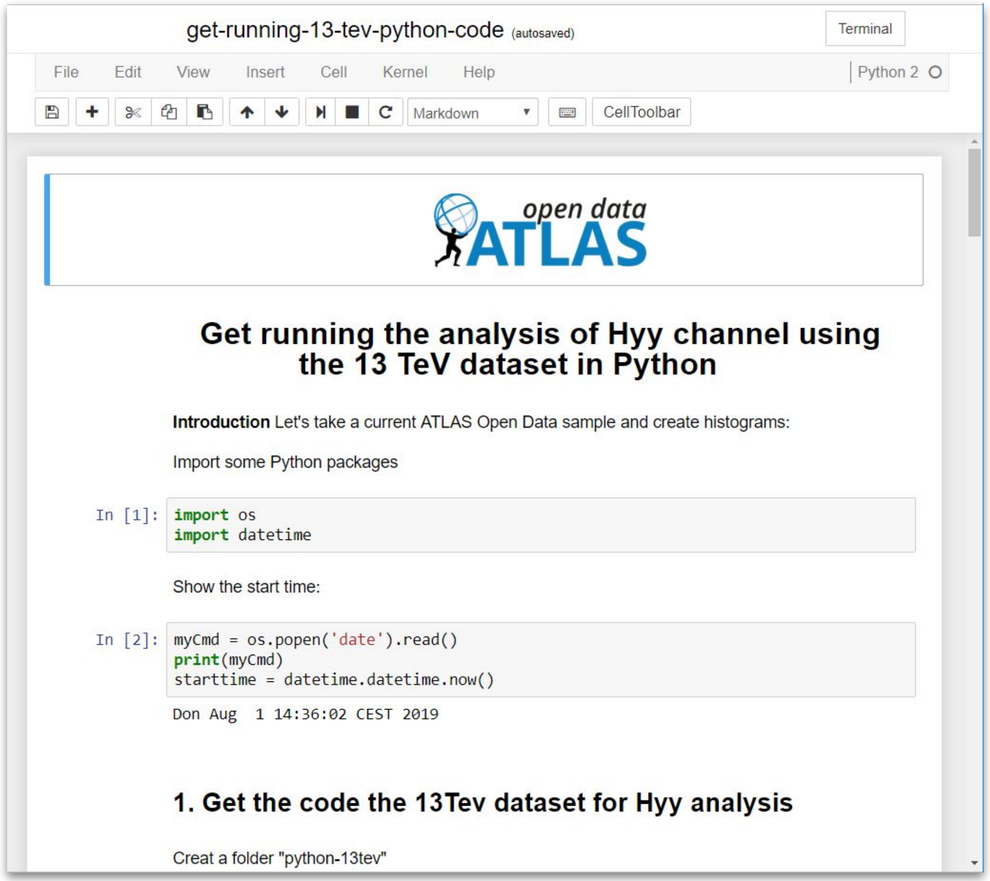
Yixin

N

The code

Data & Tools release

- Developed Jupyter interface with ROOT
- Histogram plotting, analysis methods, code explanation …



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BHASVIC
WELCOME TO
BRIGHTON HOVE & SUSSEX
SIXTH FORM COLLEGE

N

The docs

Student voice in documentation

Student voice

Being negatively charged the particle (electron) is repelled by the negative plate, and goes towards the positive plate in the opposite direction of the electric field. This suggests the electron here will experience a constant electrostatic force due to the uniform electric field between the plates, so it has an acceleration.

Why do we want to accelerate them ?

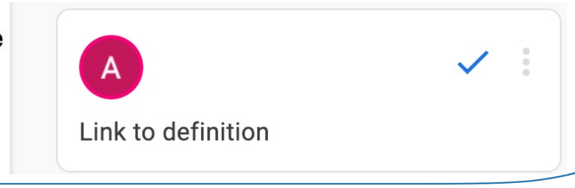
* The ability to accelerate particles to the point where they annihilate each other means when releasing energy and mass from the collision you could then observe with a series of special monitors.

Curriculum links

The reconstruction of vertices is important for many physics studies. This includes searches for new particles, identifying jets containing b-quarks or taus, and reconstruction of exclusive b-quark decays. [Reference to OCR A Kerboodle textbook for the basics on Standard Model Particles: Pages 478-479]

Peer review

Reconstructed Dilepton Mass < 75 GeV: The Z events (Z boson events) are the major background in this analysis. The Z boson has a mass of 91 GeV



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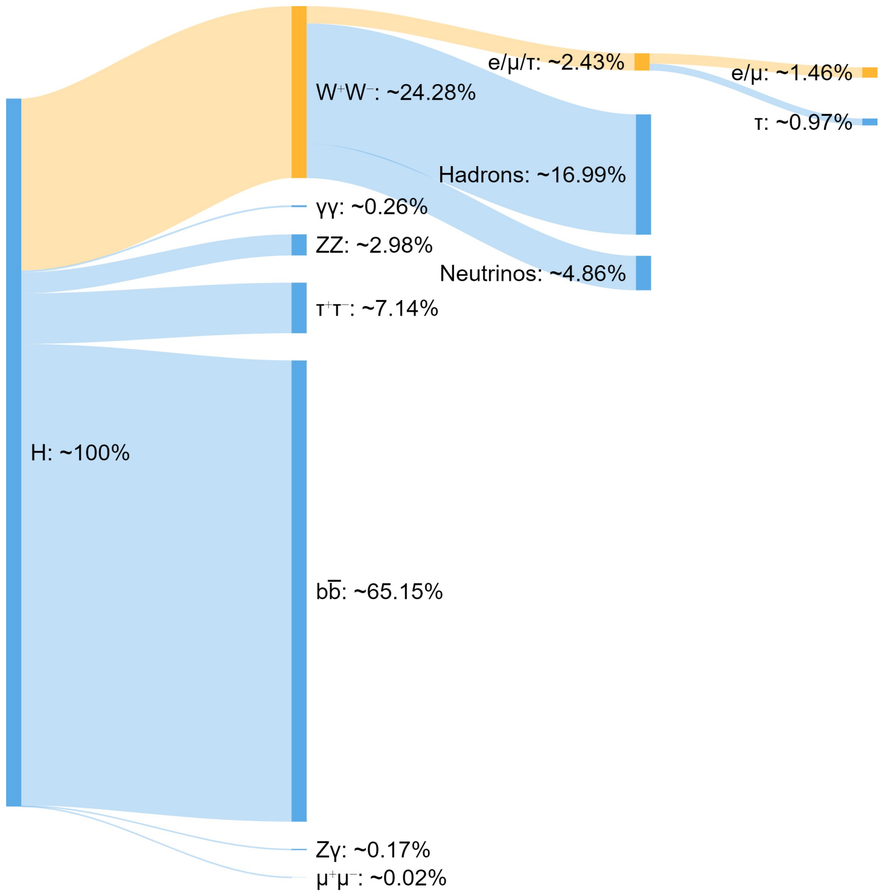
Iago

The docs

New explanations

Decay channel	Branching ratio	Rel. uncertainty
$H \to \gamma\gamma$	2.28×10^{-3}	$^{+5.0\%}_{-4.9\%}$
$H \to ZZ$	2.64×10^{-2}	$^{+4.3\%}_{-4.1\%}$
$H \to W^+W^-$	2.15×10^{-1}	$^{+4.3\%}_{-4.2\%}$
$H \to \tau^+\tau^-$	6.32×10^{-2}	$^{+5.7\%}_{-5.7\%}$
$H \to b\bar{b}$	5.77×10^{-1}	$^{+3.2\%}_{-3.3\%}$
$H \to Z\gamma$	1.54×10^{-3}	$^{+9.0\%}_{-8.9\%}$
$H \to \mu^+\mu^-$	2.19×10^{-4}	$^{+6.0\%}_{-5.9\%}$

- 🤔 That could be visualised



Ander, William, Kip, Brieuc, Maud

Documentation enhancement & translation

The translation

ATLAS Open Data

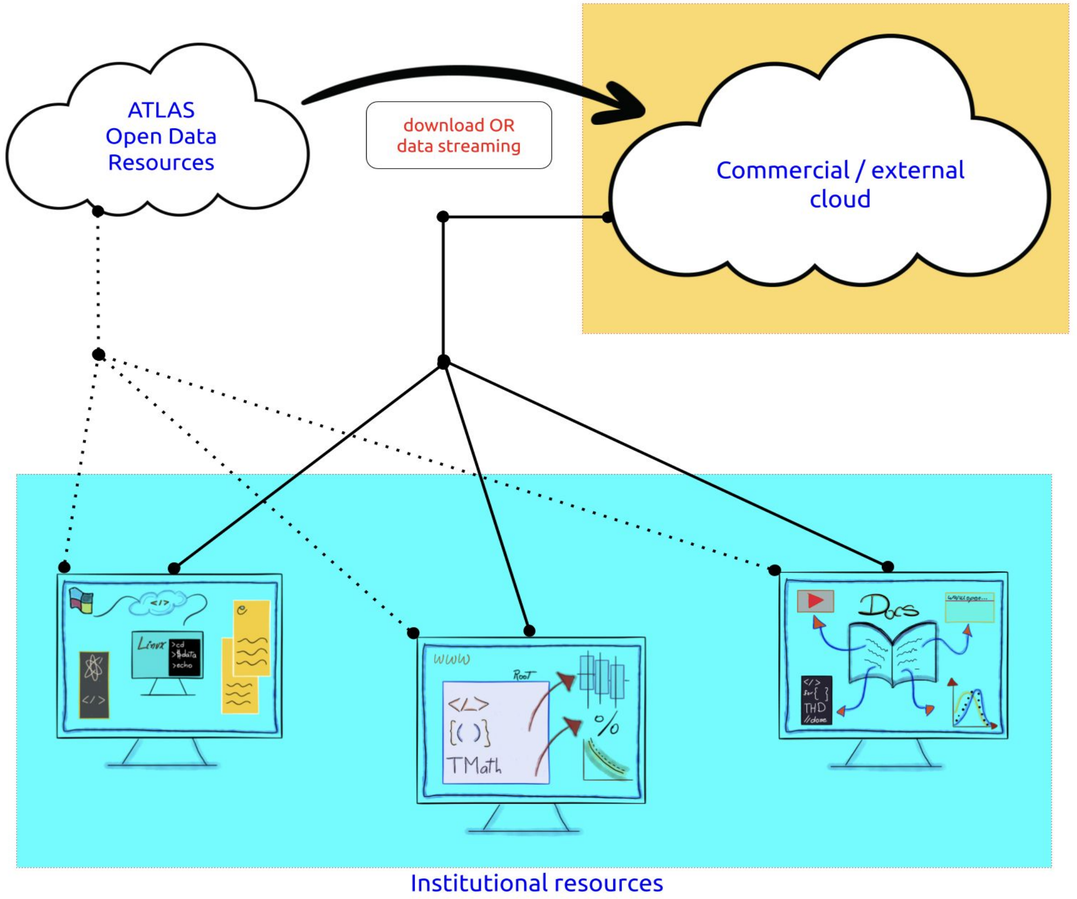
Français


N
Giovanni

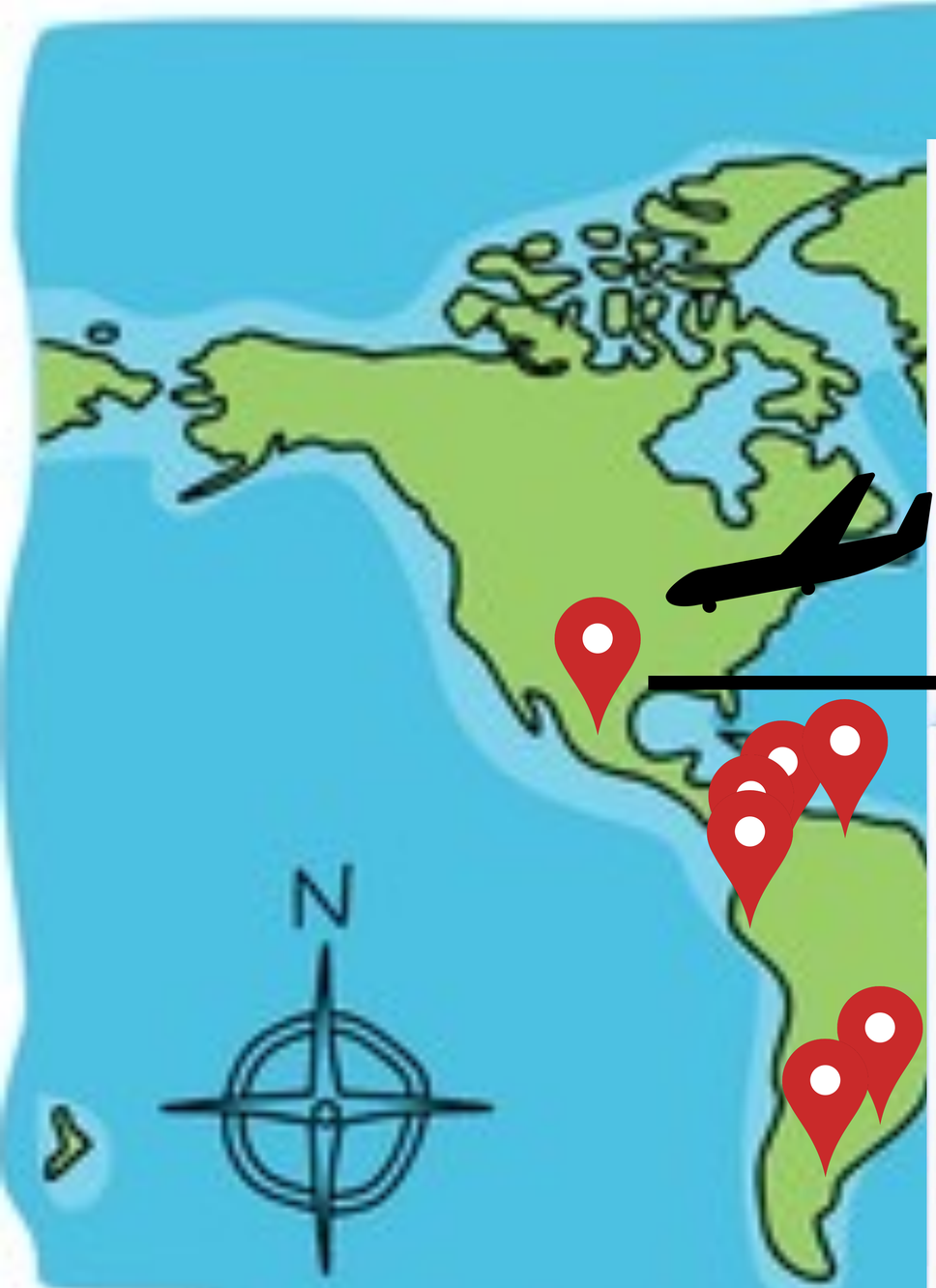
The progress

Multi-user deployment

- Developing infrastructure to deploy reproducible educational data-analysis platforms at small/medium projects & institutions



Too many students to name!



The details

Testing, testing, testing

- Resource stress-testing many times in Latin America





Future challenges

- How to ensure our learning resources are **accessible** without guidance from physicists?
- How to incorporate our resources into more schools?
- How can we emphasise the **teaching of more than just particle physics** – skills in computing, programming, coding, analysis, data science, machine learning…?
- How can we empower students with **additional skills** – presenting, poster design, teamwork, research…?
- How can we reach more students that need it?

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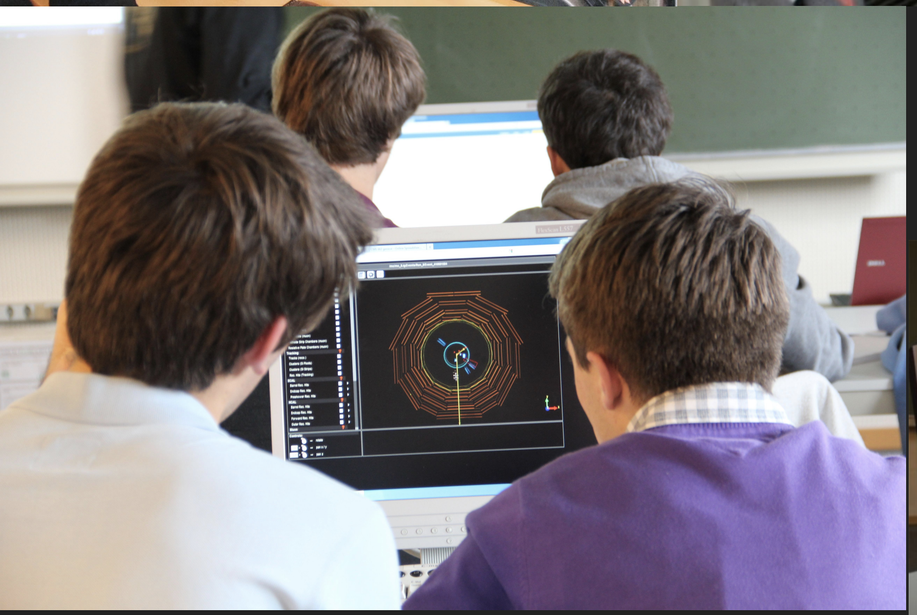
Conclusions

- ATLAS Open Data give access to research data for education
- Along with educational resources to analyse the data
- Co-creation of these resources leads to:
  - Better resources
  - Better experience for students
  - A fun experience for all involved

- Are you interested in co-creating resources with students?



Thanks!

Diolch!

*also to every single student co-creating with us