

ATLAS OPEN DATA: DEVELOPING EDUCATION AND

OUTREACH RESOURCES FROM RESEARCH DATA

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Why Open Data? And what is it?

In 2020 CERN approved a policy document to empower LHC collaborations to publish experimental data for open public access [1,2]

 Four levels of data-set uses are defined, including data and metadata from published results, dedicated subsets for outreach and education purposes, and reconstructed data for independent scientific analysis

What?

- Outreach data sets provided in simplified and self-contained formats suitable for educational and public understanding purposes
- Require lightweight analysis environments to allow easy data exploration

Why?

- Facilitate outreach and training important resource to science communicators and educators at practically all levels
- Increases public understanding of science and research leading to increased trust in science and scientists
- Promote citizen science and the public interest in scientific development

ATLAS Open Data

Data

- Collision data: 1 fb⁻¹ (8 TeV) 10 fb⁻¹ (13 TeV)
- Simulation: 120 samples of various processes
- Around 100 variables, truth-level and reconstructed Analysis frameworks
- Browser-based histogram analysis
- Examples based on Python or on ROOT
- Jupyter notebooks (Python/C++)
- Analysis examples: HWW/HZZ, tt, W/Z, Hγγ, etc
- Event visualizer

Documentation

- Ample instructions for software, examples, VM
- Documentation (secondary school) student tested
 Community effort

Major contributions from students:
 Postgraduate, qualification work,
 Summer students

Activities at all levels!

- Secondary school demonstrations
- Summer school introdution sessions
- Undergraduate lectures
- Seminars
- Outreach events

Analysis tools

> Open Data

The ATLAS Collaboration's current approach on the release of datasets is intended for Education, Training and Outreach activities around the World. In order to fulfill that objective, the ATLAS Open Data project was created.

ATLAS Open Data project aims to provide data and tools to high-school, masters and undergraduate students, as well as teachers and lecturers, the peducate them in physics analysis techniques used in experimental particle physics.

The ATLAS datasets:

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ATLAS discrete visualisation

This is a BOOLTS application that allows you to explore the ATLAS detector.

Important: two in minist this app can take up to 60 a seconds to load So please, be patient.

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Histogram Analyser: Real is timulated Gata

Fig. 1 and 1 an

Real and

simulated

data

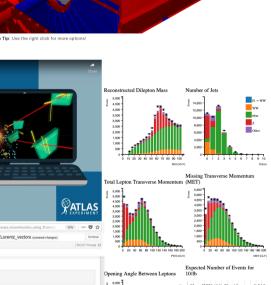
HIGGS

OPEN DATA

TUTORIAL

Let's no time and code on you browner.

Fro Tip: Use the right click liow this video for a complete explanation and the Higgs boson with your mouse - ATLAS Open Data Tidorial



Expected Number of Events for 10th | H + WW (66) Significance: 0.318 | WW (5214) | WW (52

References:

[1] Edgar Carrera Jarrin on behalf of the ALICE, ATLAS, CMS and LHCb collaborations, LHC experiments and their Open Data, PoS(LHCP2021)334, https://cds.cern.ch/record/2802456?ln=en

Documen-

tation

[2] Data Preservation and Long Term Analysis in High Energy Physics (DPHEP) Study Group, CERN Open Data Policy for the LHC Experiments, CERN-OPEN-2020-013, https://cds.cern.ch/record/2745133

[3] Meirin Oan Evans on behalf of the ATLAS Collaboration, ATLAS Open Data – a genuinely collaborative approach for the creation of educational resources, ATL-OREACH-PROC-2021-001, https://cds.cern.ch/record/2783039
[4] The ATLAS Collaboration, Review of the 13 TeV ATLAS Open Data release, ATL-OREACH-PUB-2020-001,

https://cds.cern.ch/record/2707171?ln=en

[5] Arturo Sánchez Pineda and Giovanni Guerrieri on behalf of ATLAS Software and Computing, A proposal for Open Access data and tools multi-user deployment using ATLAS Open Data for Education, ATL-SOFT-PROC-2021-008, https://cds.cern.ch/record/2772504



