

PUNCHLunch –

the online lunch seminar of the PUNCH4NFDI Consortium

Every third Thursday, 12:30-13:30 hrs: keynote and discussion



Thursday, 18 September 2025, 12:30 hrs:

Dr. Baida Achkar, Prof. Dr. Arnulf Quadt, Dr. Sebastian Wozniowski (Georg-August-Universität Göttingen)

EXPLORE: A Scalable Infrastructure for LHC Open Data Analysis and FAIR Data Provisioning

Abstract:

The **EXPLORE service**, developed within the PUNCH4NFDI consortium in TA2 and offered as service by TA6, provides a scalable and accessible infrastructure for analyzing **Large Hadron Collider (LHC) Open Data** in line with FAIR (Findable, Accessible, Interoperable, Reusable) principles. Hosted at the **GoeGrid cluster in Göttingen**, EXPLORE lowers barriers to high-energy physics (HEP) data analysis by eliminating the need for CERN or institutional credentials, specialized local setups, or dedicated hardware.



Through ready-to-use containerized environments, dynamic resource management, and batch processing with **HTCondor**, EXPLORE enables users worldwide, including high-school students, educators, and unaffiliated researchers, to run real ATLAS Open Data analyses at scale. Remote data access is seamlessly preconfigured, ensuring reproducibility and efficiency. A **showcase analysis** demonstrates the platform's capability: a **top–antitop (tt) production analysis** using the **ATLAS Open Data 2025 Beta release** (36 fb⁻¹ at $\sqrt{s} = 13$ TeV). The analysis successfully processed approx. 97 million events across 58 parallel jobs, validating EXPLORE's performance, scalability, and suitability for large-scale workflows.

Since its deployment in 2023, EXPLORE has evolved from prototype to public adoption, now supporting education, outreach, and independent research. It complements existing interactive ATLAS Open Data tools (e.g. Jupyter notebooks) by providing compute-heavy batch analysis capabilities. Early adoption in Göttingen HEP masterclasses and dissemination efforts (ATLAS Week, CoRDI 2025, outreach to schools) underline its growing role as a bridge from **Open Data in theory** to **Open Science in practice**.

Key Impact: EXPLORE empowers global participation in HEP by making real analyses accessible beyond institutional boundaries, serving as both a training platform and a research-grade environment. For access and tutorials: <https://punchlogin.goegrid.gwdg.de>

Connection details:

ZOOM Meeting “PUNCHLunch seminar”: <https://indico.desy.de/event/50656/>

Webinar ID: 919 1665 4877, **passcode:** 481572

Next event: New technologies and solutions for reducing the environmental and climate footprint of research infrastructures (Gergely Sipos), 16 October 2025

Connect to PUNCH4NFDI:

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