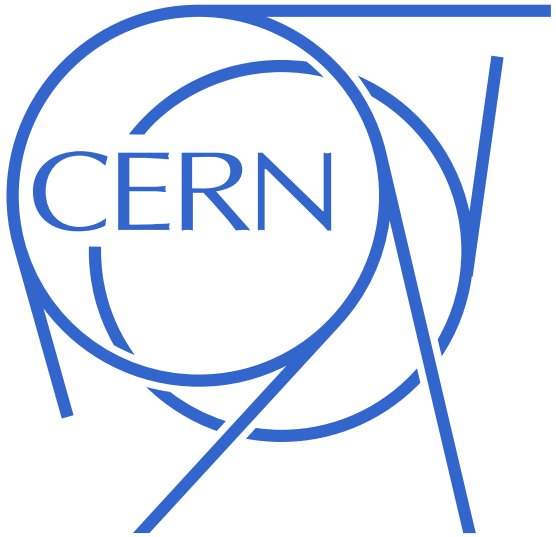
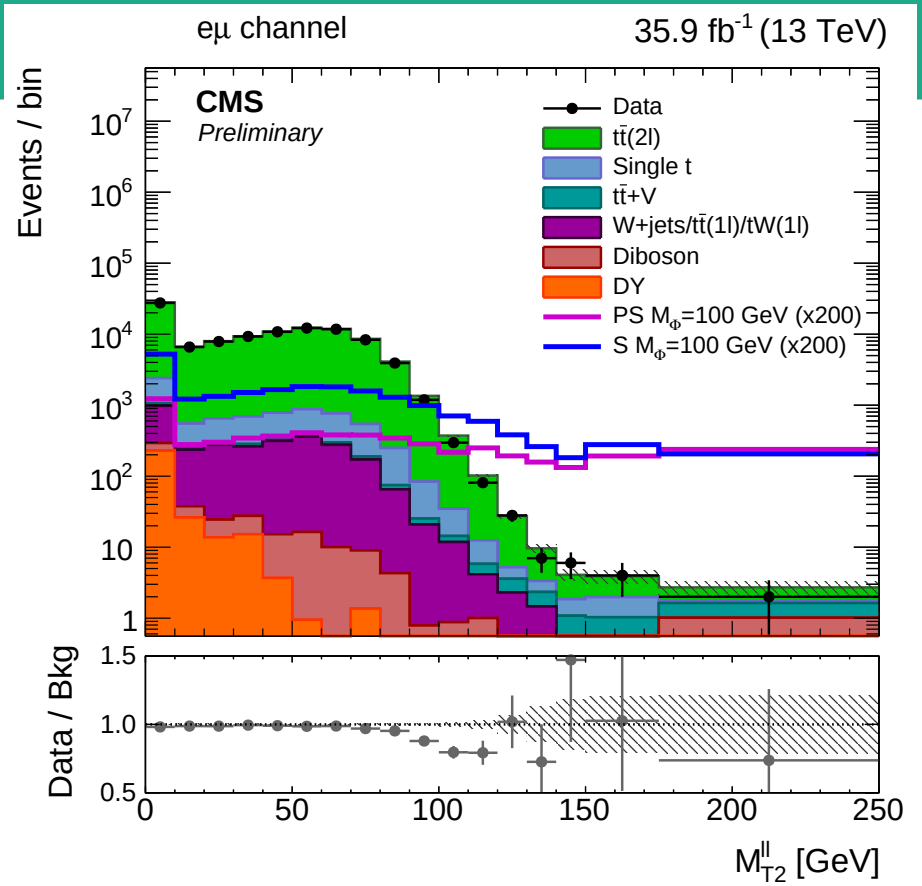
CERN

- Fundamental (“high energy”) Physics (“HEP”): uncover what the universe is made of and how it works; operates the LHC accelerator
- International Organization, est. 1954: 2’500 staff and 15’000 physicists with 110 nationalities “using” CERN
- Long tradition of technology in-house excellence



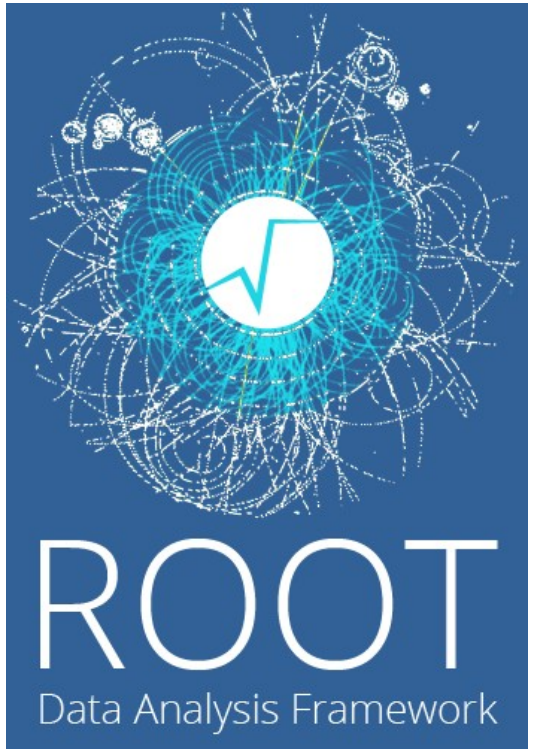
Data

- Statistics: the foundation of HEP
- Models describe nature almost completely: exabytes of data needed to find anything special



ROOT

- CERN co-maintains open-source data analytics platform; 25 developers
- Scientific, high throughput, in production and mature, optimized over decades: https://root.cern



Involved Parties from CERN

- ROOT https://root.cern: statistics, data
- Knowledge Transfer https://kt.cern/: bridging to industries
- CERN EU Projects Office https://cerneu.web.cern.ch/: project management

Relevance to CERN

- Helping society with CERN expertise is part of CERN's mission
- Showing impact to member states
- Expanding streaming data analytics feature; demonstrating applicability outside physics

Past Activities in Context

- Project HighLO: help regulators find fraud in financial markets https://highlo.org
- Vast experience with statistics and ML / AI, see for instance https://indico.cern.ch/event/1407421/overview
- Scientific analysis of 2EB (2’000PB) of data

Relevant Technical Expertise

- Bringing high-performance analysis to non-experts
- Requirement analysis with stakeholders, releasing production-grade projects, support
- Data ingestion and handling, statistics, ML/AI

Participation Data Analytics Team / ROOT

- Senior statistics expert & head of physics ML project
- Senior data analytics expert
- Data modeling / distributions expert
- All CERN staff

Conclusion

- Applying existing expertise: scientific data analytics, big data, bridging to other domains
- Following CERN's mission, expanding ROOT's features
- We love data: curious to help you extract knowledge you have never seen before!