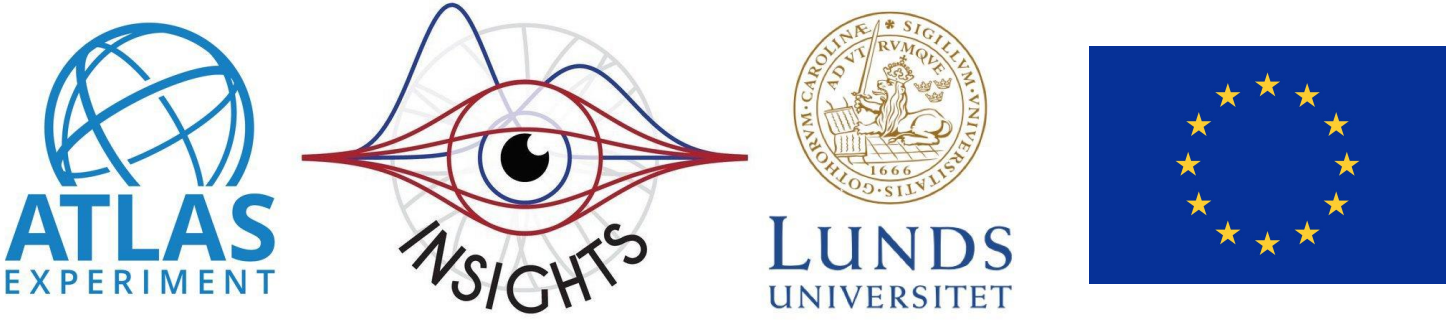


INSIGHTS Mid-term Review:
Lund University

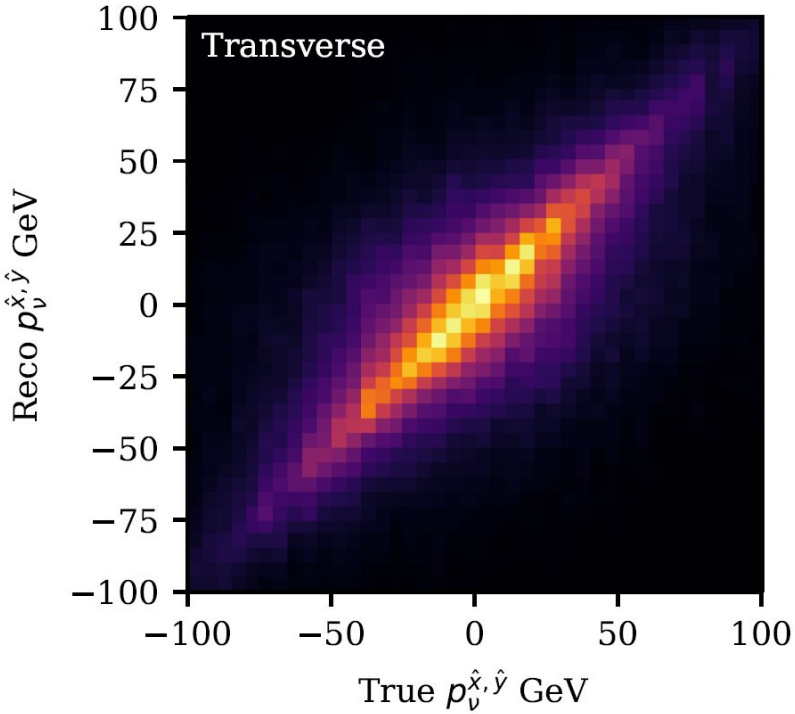
Nathan Simpson

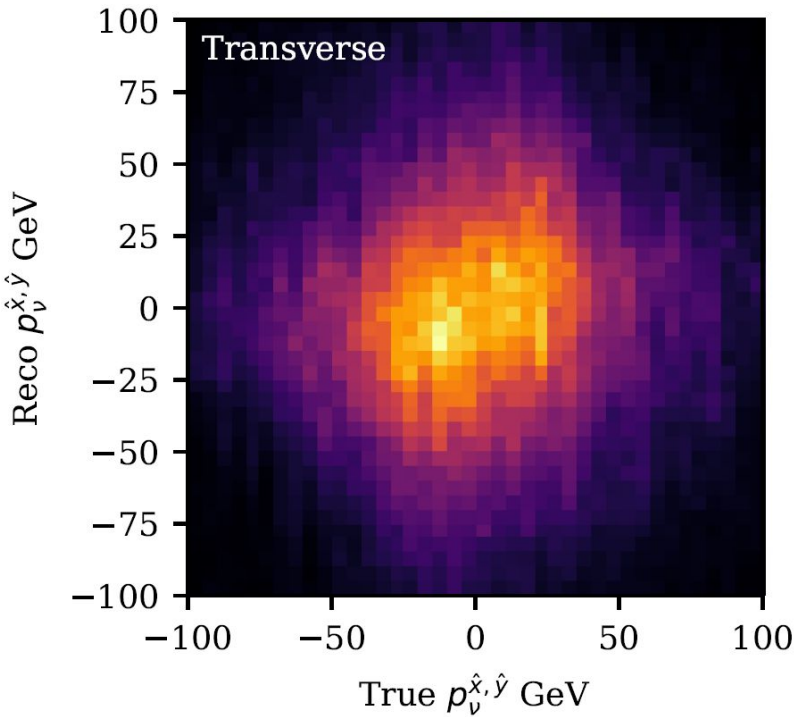
Who am I?

Nathan Simpson, ESR

- Undergraduate Masters degree from University of Manchester, UK
- Previous work was on Bayesian statistical analysis
- Has tree-like properties

Previous work: Nested Sampling @



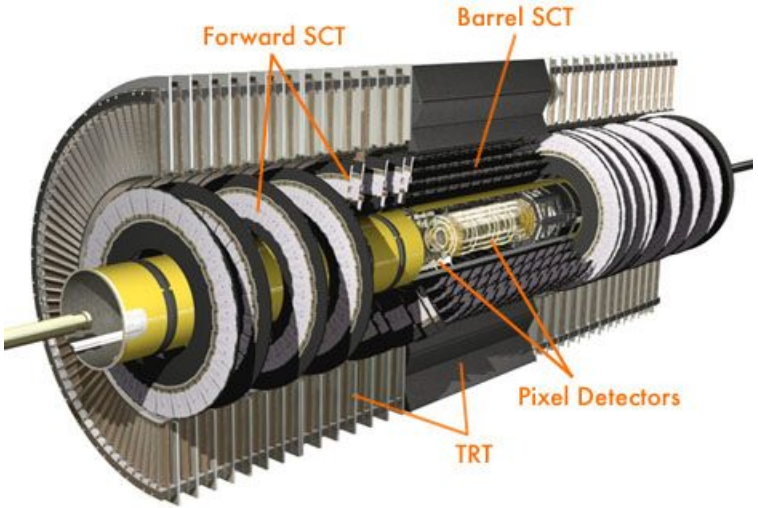


Outline of project work

Qualification task on Transition Radiation Tracker -- tracks path of particles & can identify them!

Goal: Align two software frameworks for calibration on simulated and real data into one.

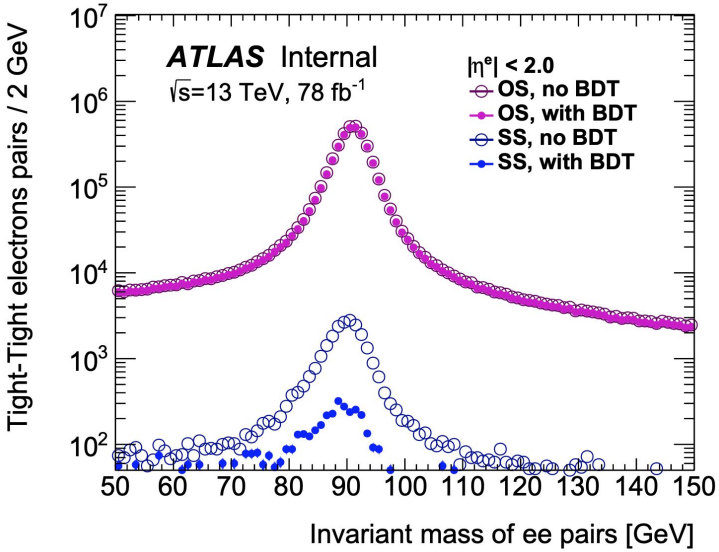
Involves learning basics of ATLAS software + additional physics.



Outline of project work

Analysis -- <u>doubly charged Higgs boson</u>

- Various machine learning contributions
  - ‘Charge flip killer’
    - Big improvements seen for electrons
- Bayesian inference
  - Re-approach data analysis with Bayesian tools
    - See what happens!



Source: Otilia Ducu, SS/3Lep, Moriond 2017 Int note

Training

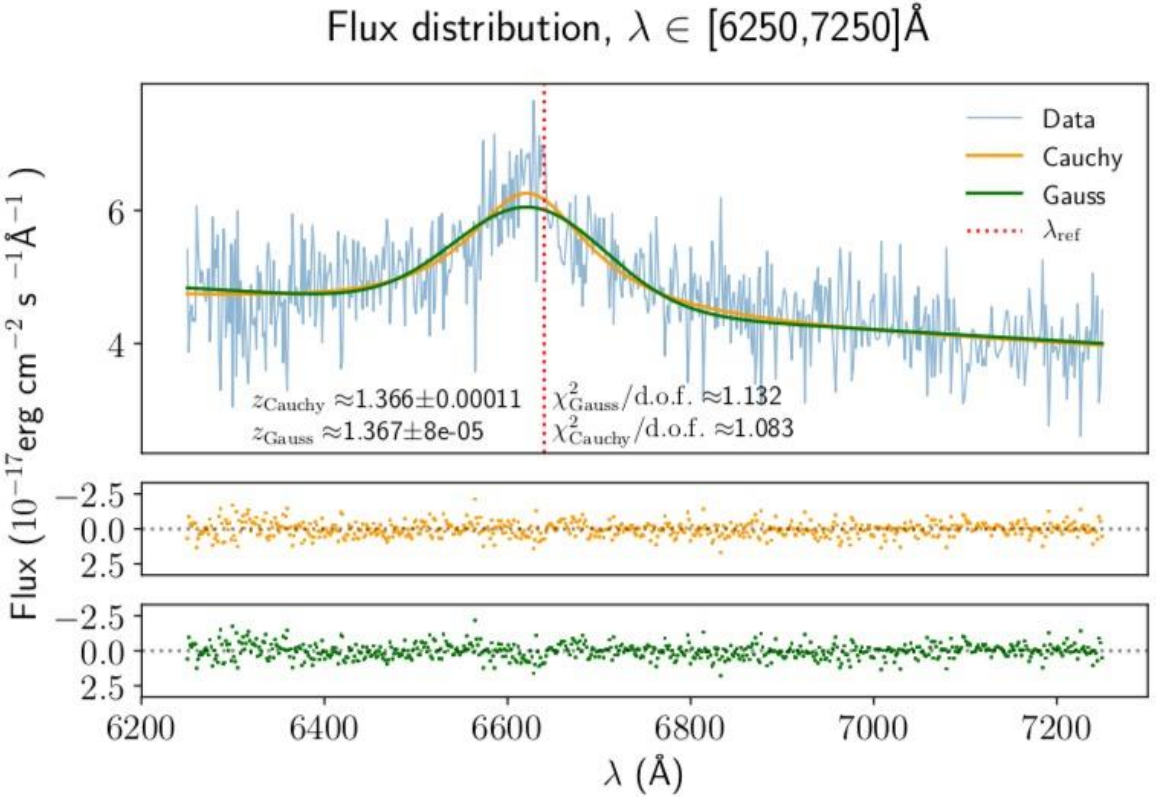
done!

- Courses:
  - Jupyter notebooks
  - Statistics ~~in Astrophysics~~
- Events:
  - INSIGHTS ML + Stats
  - DESY ML school
  - Nikhef Stats

todo

- Future INSIGHTS events on Stats + ML
- DarkMachines conference 2019 (applications of ML in particle physics)
- Physics + other relevant course(s) within LU

Example plot: Quasar flux emission



Secondments:

CERN
(October 2019)

- Interacting with experts in analysis
- Contribute to software development @ CERN

Pangea Formazione
(est. Winter 2020)

- Application of statistical techniques developed during analysis to real world problems
- Mutual knowledge transfer

Thanks for listening!

Tack så mycket!