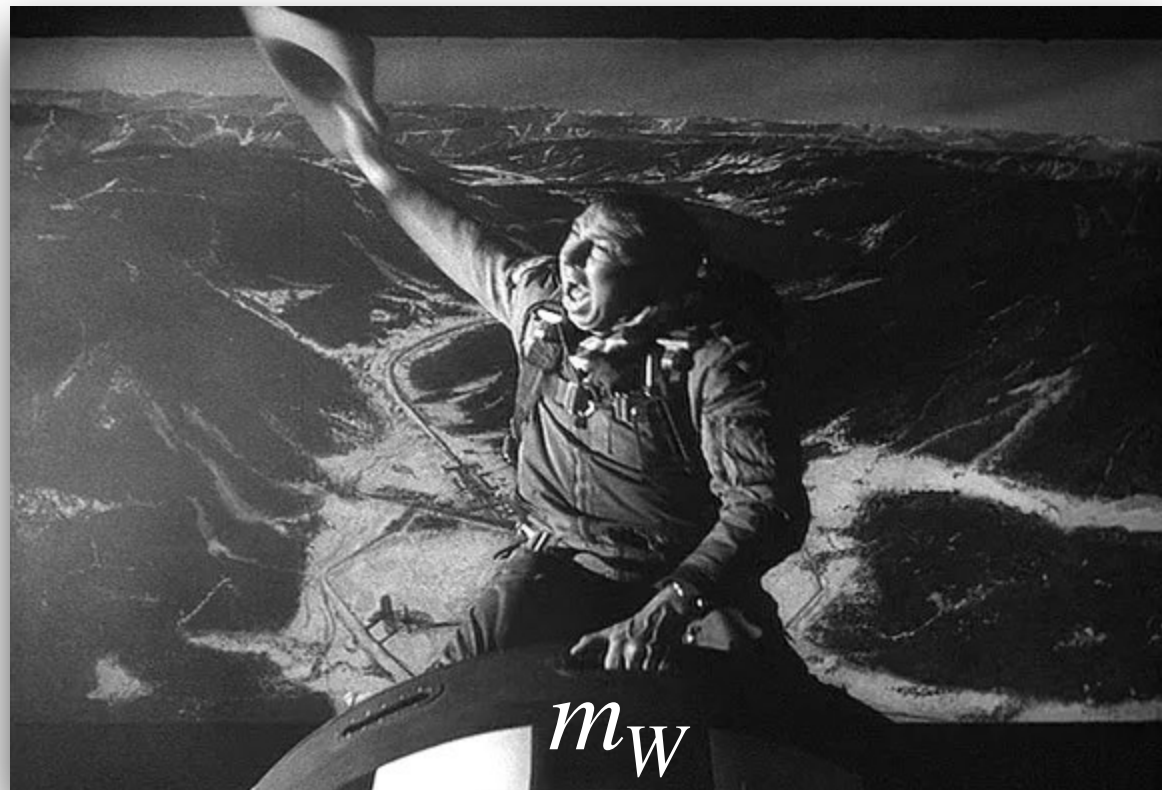


My new adventure in ATLAS or: how I learned to stop worrying and love the m_W mass



FH Fellow Meeting 2023

April 21, 2023

Filippo Dattola

About me

From Italy, **Calabria.**



Beautiful nature and ancient history.

About me

Bachelor and master studies in Trieste.



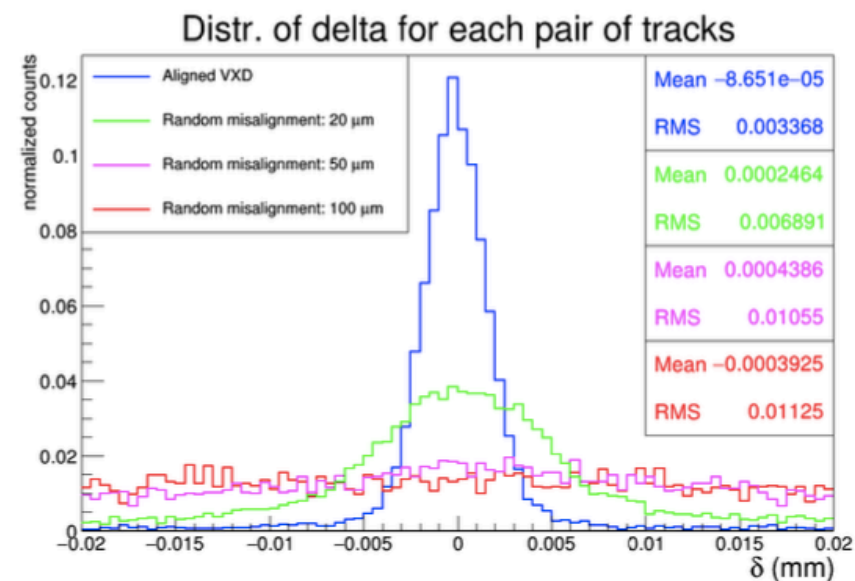
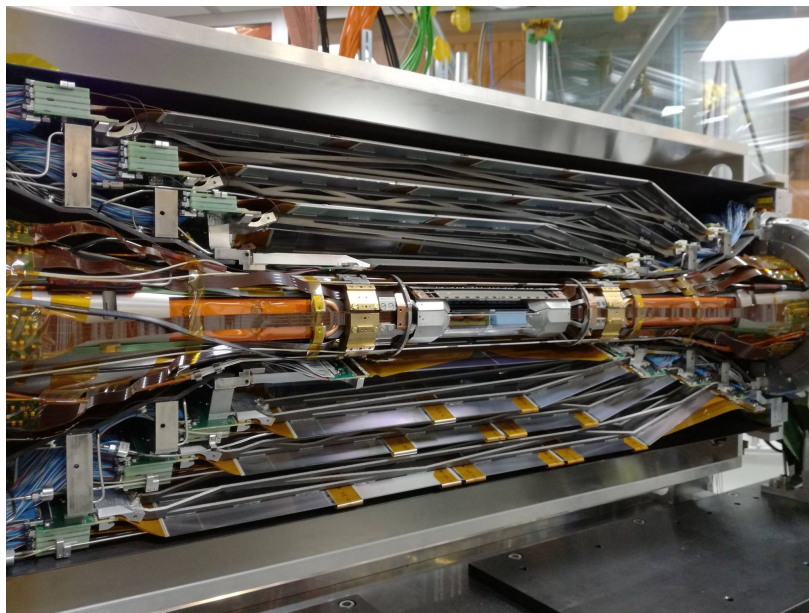
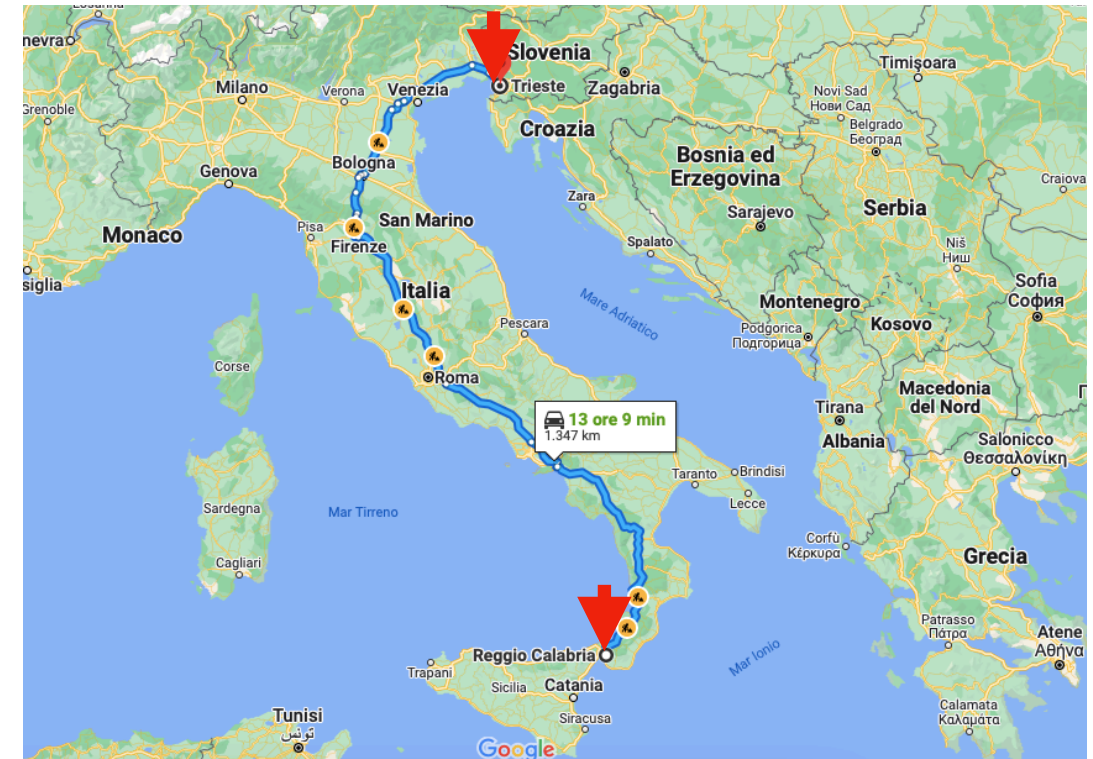
B. Sc. (2015): analysis of models for the production of deuterons in the hadronisation of quark-gluon plasma.



M. Sc. (2018): monitoring and optimisation of the alignment of the Belle II vertex detector.



UNIVERSITÀ
DEGLI STUDI
DI TRIESTE

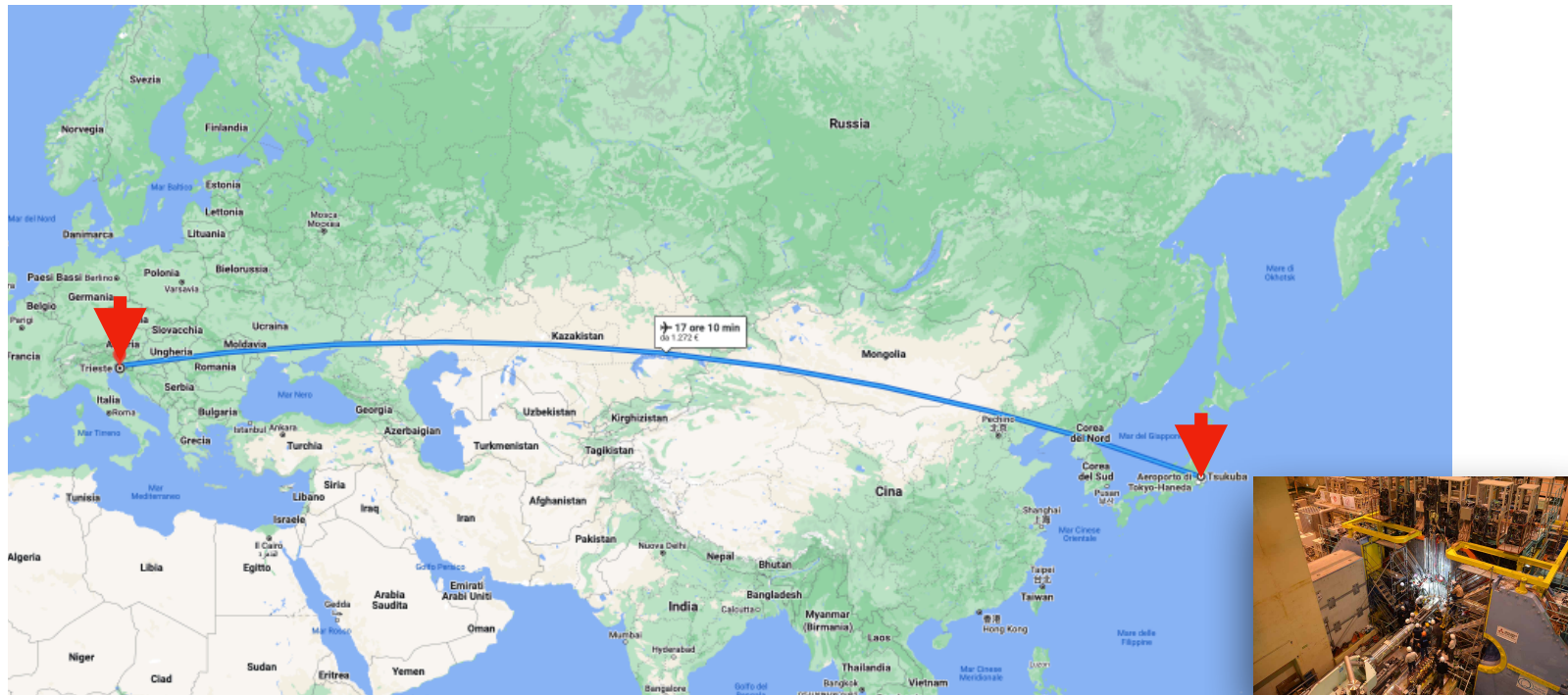


About me

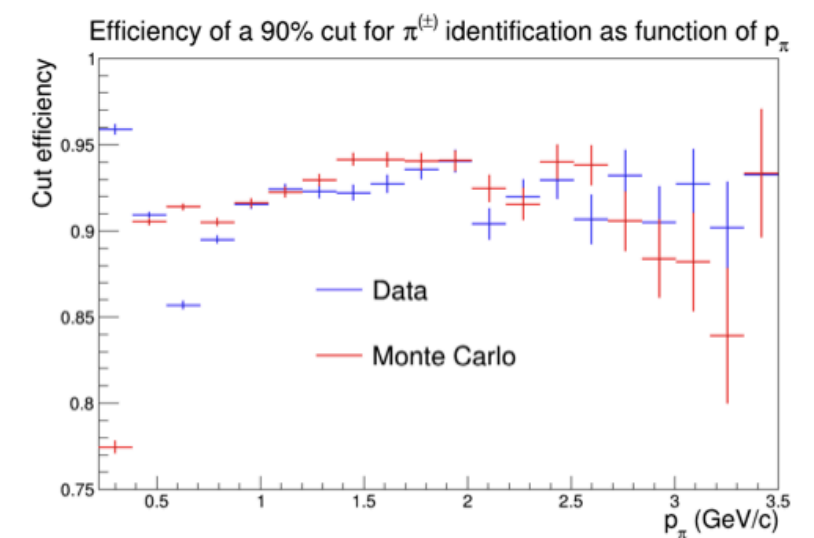
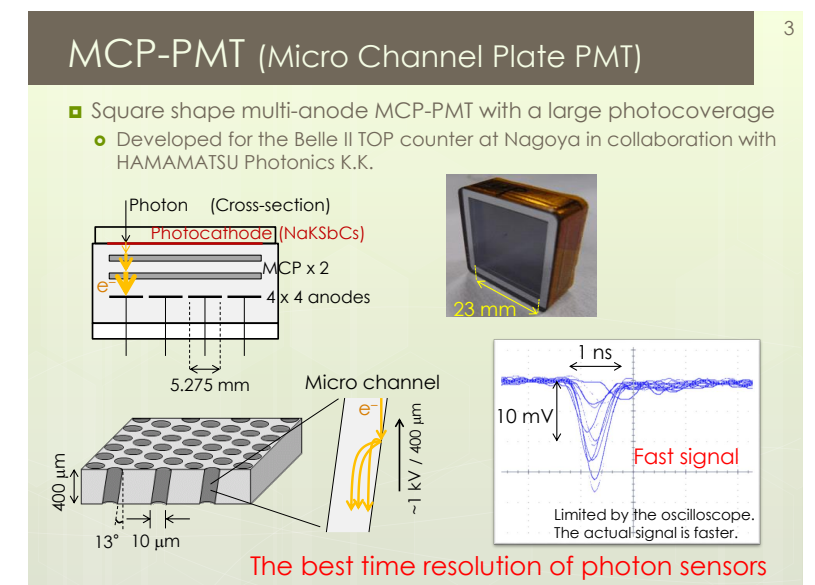
Intermezzo: visiting student at the KEK laboratories



At KEK for a couple of months after my master in 2018.



Analysis of early Belle II data and study of ALD-Micro-Channel-Plate photomultipliers for the Time-Of-Propagation counter of the Belle II detector.

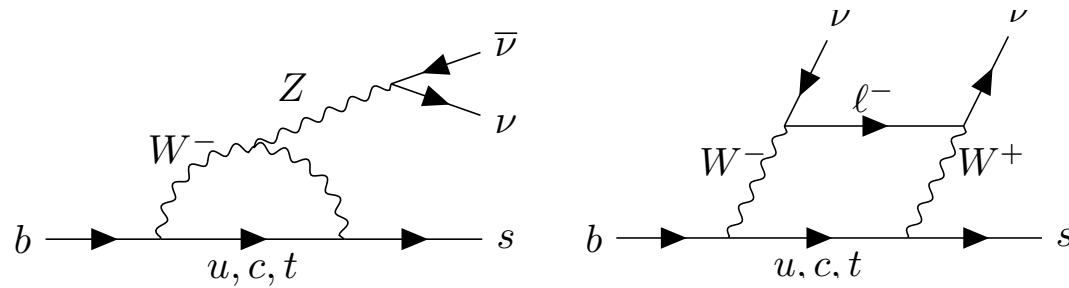


About me

Moved to Hamburg for my PhD (2018-2022).



Search for the $B \rightarrow K^{(*)}\nu\bar{\nu}$ decays and tracking performance studies.

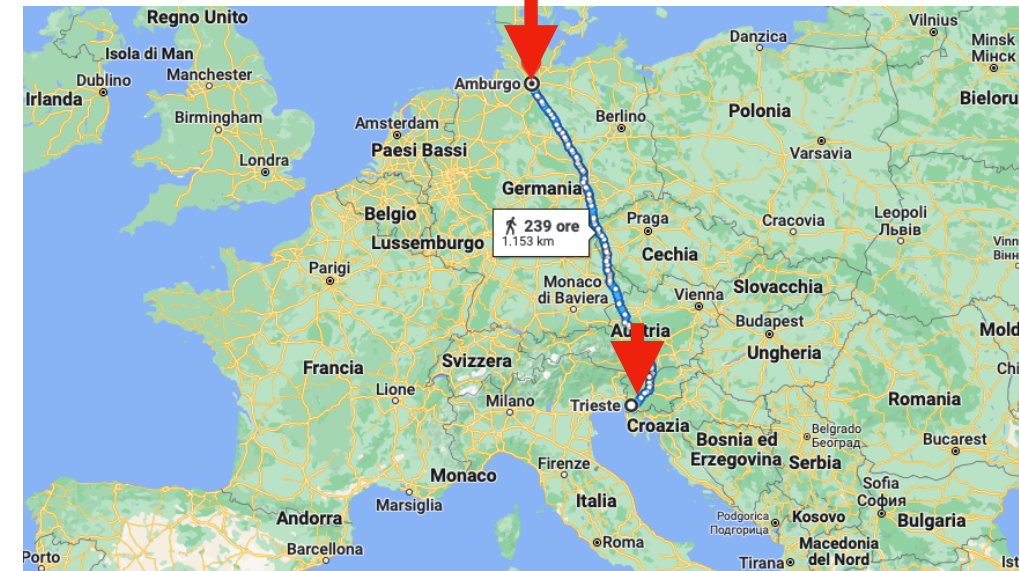


Very rare decays:

$$\text{BR}(B^+ \rightarrow K^+\nu\bar{\nu})_{\text{SM}} = (4.6 \pm 0.5) \times 10^{-6}$$

$$\text{BR}(B^+ \rightarrow K^{*+}\nu\bar{\nu})_{\text{SM}} = (8.4 \pm 1.5) \times 10^{-6}$$

Not observed yet, possible enhancement from physics beyond the Standard Model.



Contributed to a novel analysis method.
First analysis published in 2021.

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Search for $B^+ \rightarrow K^+\nu\bar{\nu}$ Decays Using an Inclusive Tagging Method at Belle II

F. Abudinén *et al.* (Belle II Collaboration)
Phys. Rev. Lett. **127**, 181802 – Published 27 October 2021

About me

Moved to Hamburg for my PhD (2018-2022).



Search for the $B \rightarrow K^{(*)} \nu \bar{\nu}$ decays
and tracking performance studies.



Amazing DESY team work !



**Still actively contributing to the
analysis update with $6 \times$ larger dataset:**

keep an eye on it, new results soon...



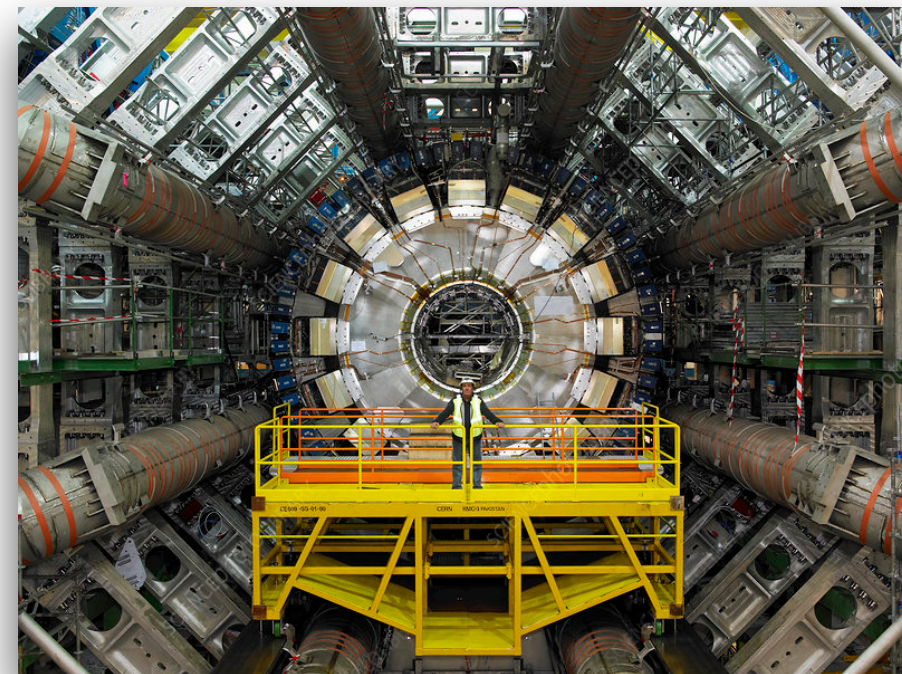
My current work

Now ATLAS...

New opportunity to learn and prove myself!

Working on **luminosity measurements** in Run3 data...

...and on the **W-mass measurement with low pileup data.**

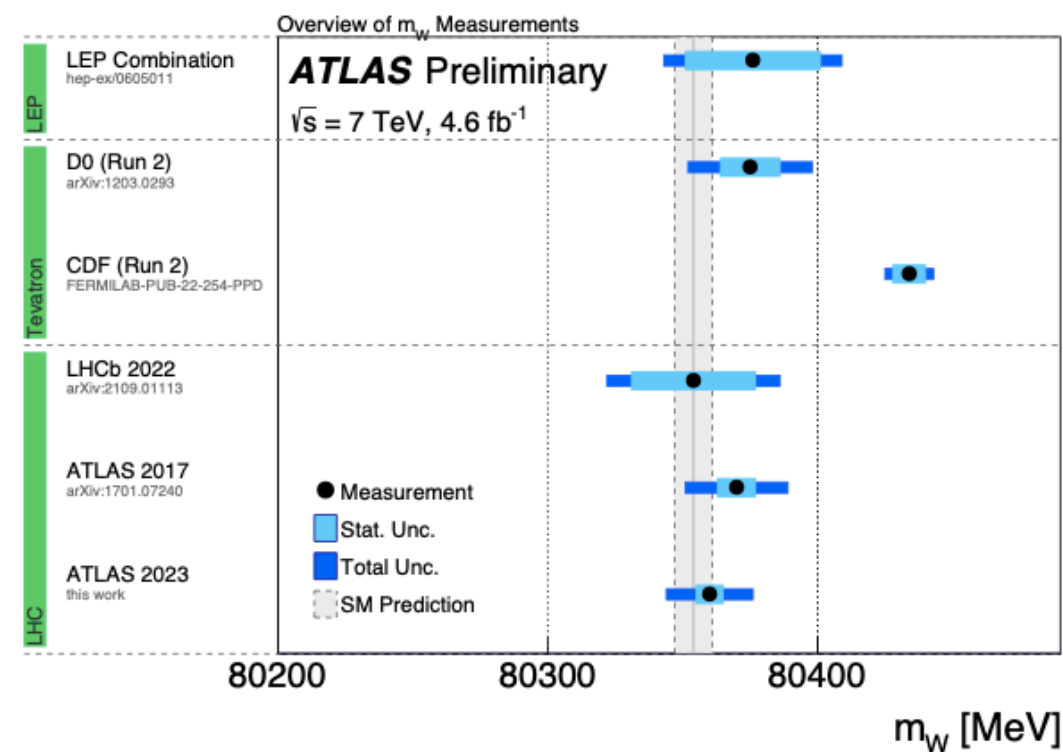


The W boson mass is arguably the most difficult measurement in HEP ...

***The limit** of these measurements is the limit of our understanding of QCD theory*



ATLAS-CONF-2023-004



My current work

Now ATLAS...

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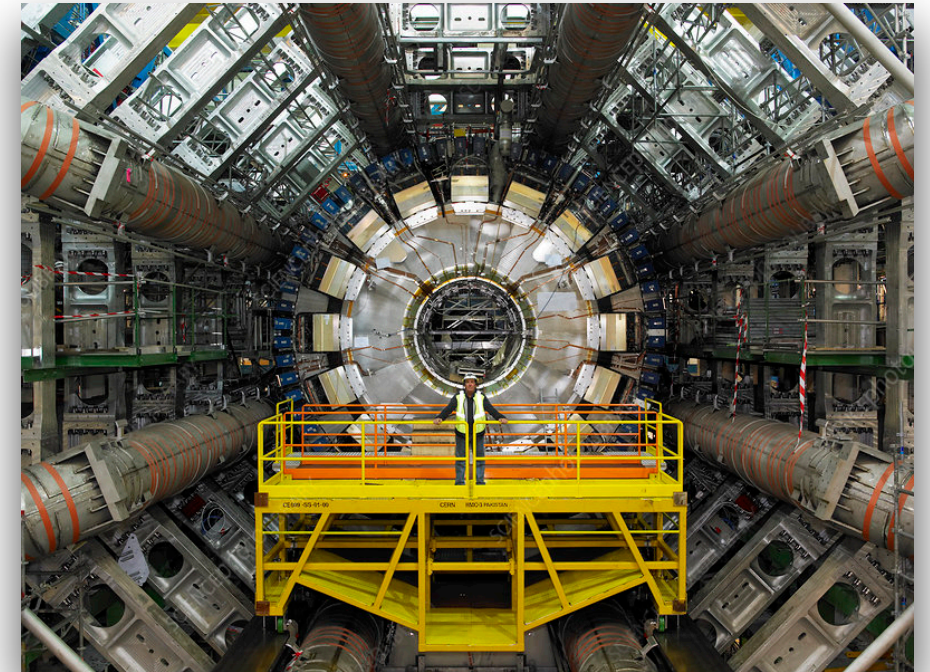
Working on **luminosity measurements** in Run3 data...

...and on the **W-mass measurement with low pileup data.**

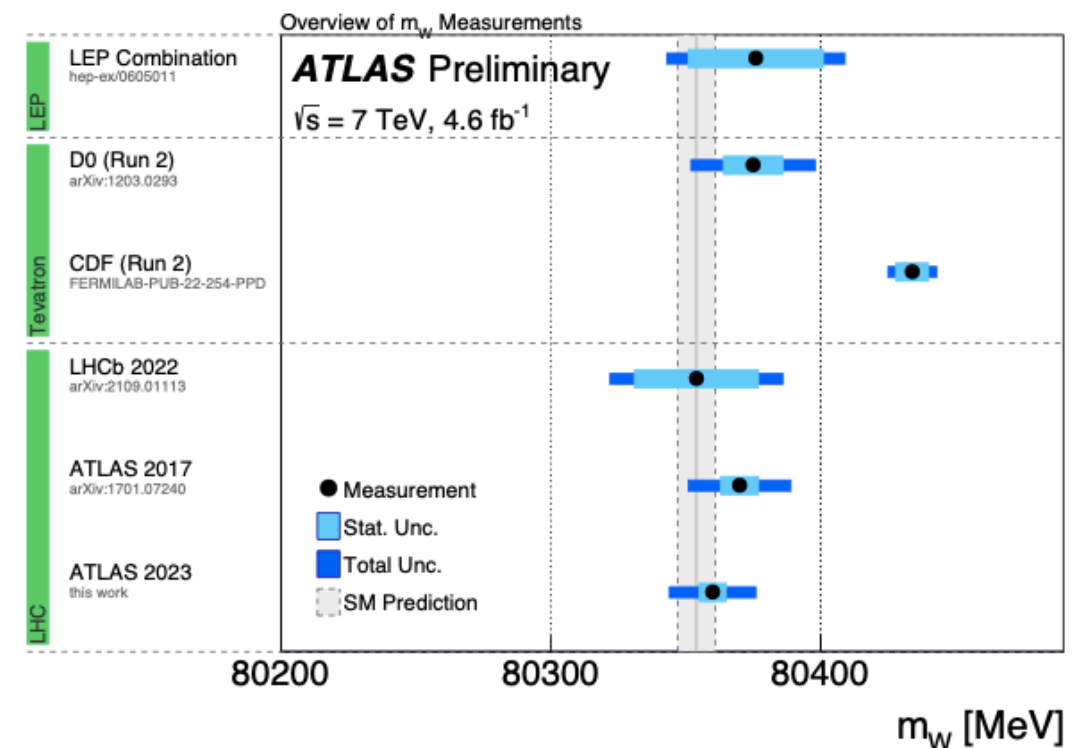
Goal: increase the measurement precision.

Help to:

- implement a **simplified Gaussian model for fits** to extract the m_W .
- **improve the QCD modelling** which is one of the major current limitations of the measurement.



ATLAS-CONF-2023-004



My Favourite Plot

100 consecutive pulses from the pulsar CP 1919,
from the PhD thesis of Harold D. Craft, Jr. (September 1970).

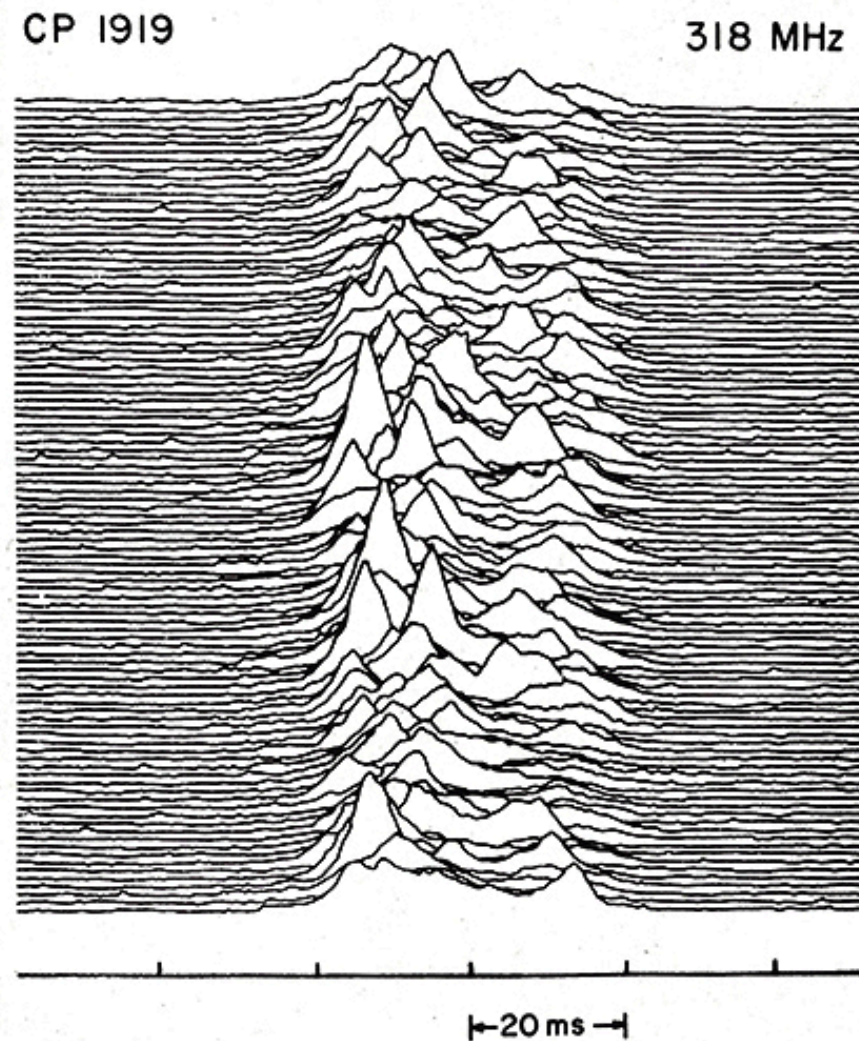


Fig. 2. - 100 consecutive pulses from the pulsar CP 1919. Time increases from bottom to top. Pulsar period is 1.34 seconds.

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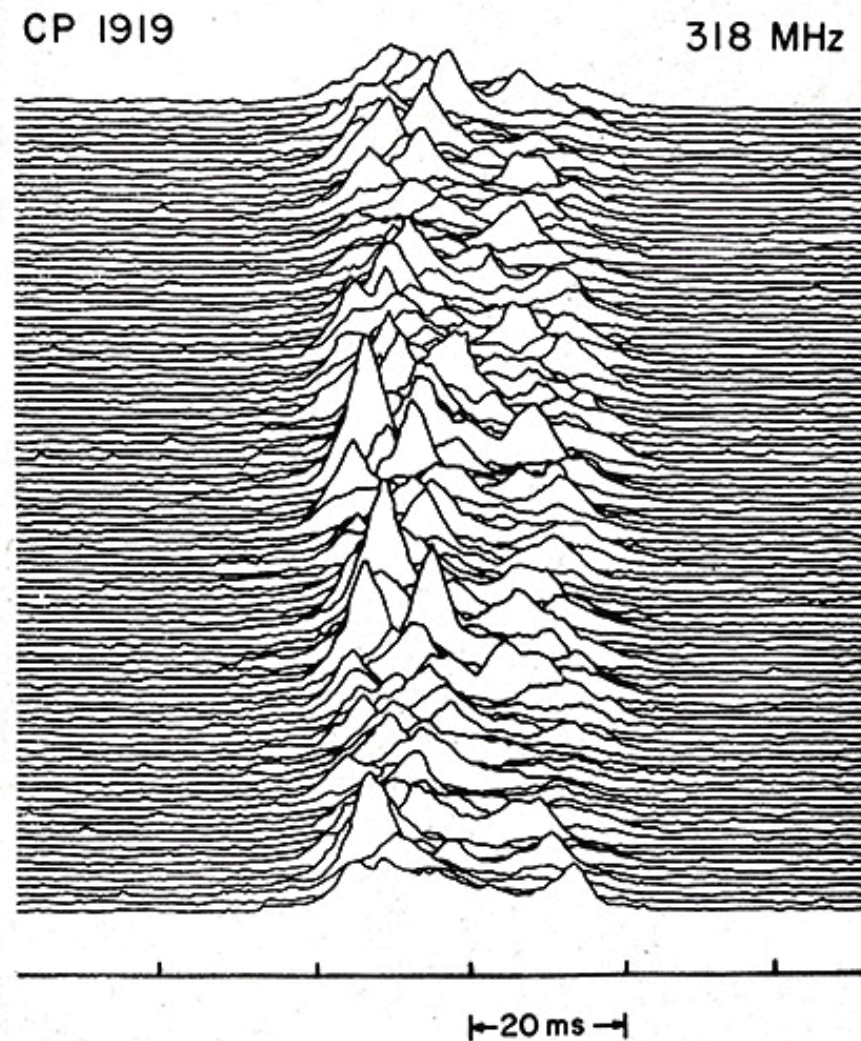


Fig. 2. - 100 consecutive pulses from the pulsar CP 1919. Time increases from bottom to top. Pulsar period is 1.34 seconds.

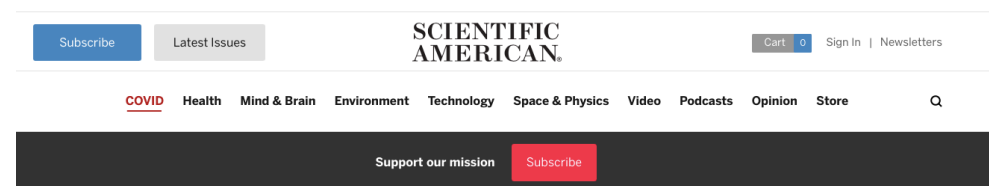
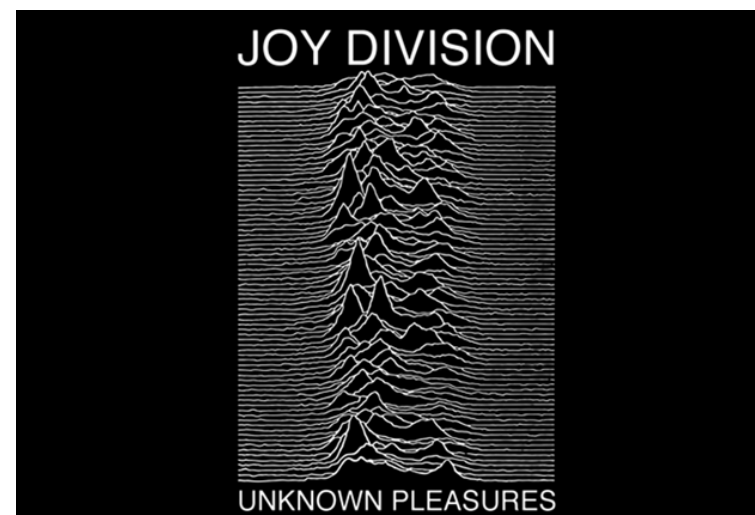
JULY 12, 2019

Joy Division: 40 years on from 'Unknown Pleasures,'
astronomers revisit the pulsar
from the iconic album cover

by Patrick Wettevrede, The Conversation



In 1979, the plot **becomes the iconic cover**
of the album "Unknown Pleasures" by Joy Division.



SA Visual

Pop Culture Pulsar: The Science
Behind Joy Division's *Unknown*
Pleasures Album Cover