

# Bernhard Spaan

Physicist and Friend

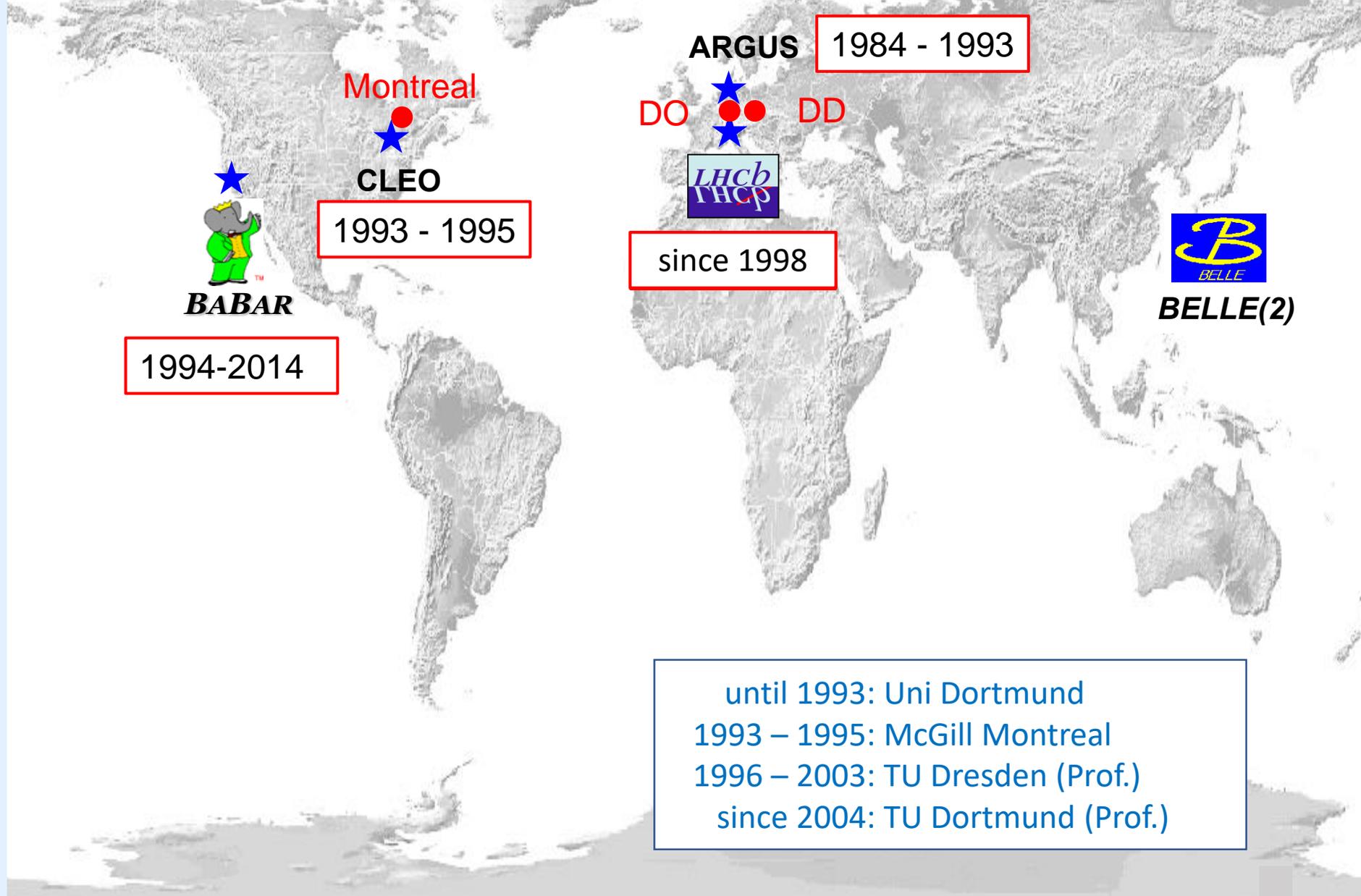
Marcel Merk, LHCb week  
Dortmund, Sept 6, 2022

Thanks to Johannes Albrecht, Uli  
Uwer, Dirk Wiedner for input



# 1: Bernhard's legacy in Flavour Physics

# Bernhard and Flavour Physics around the world



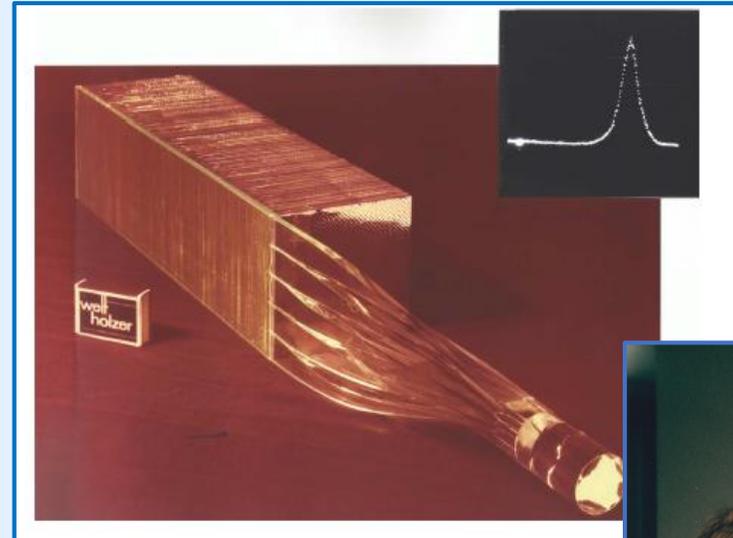
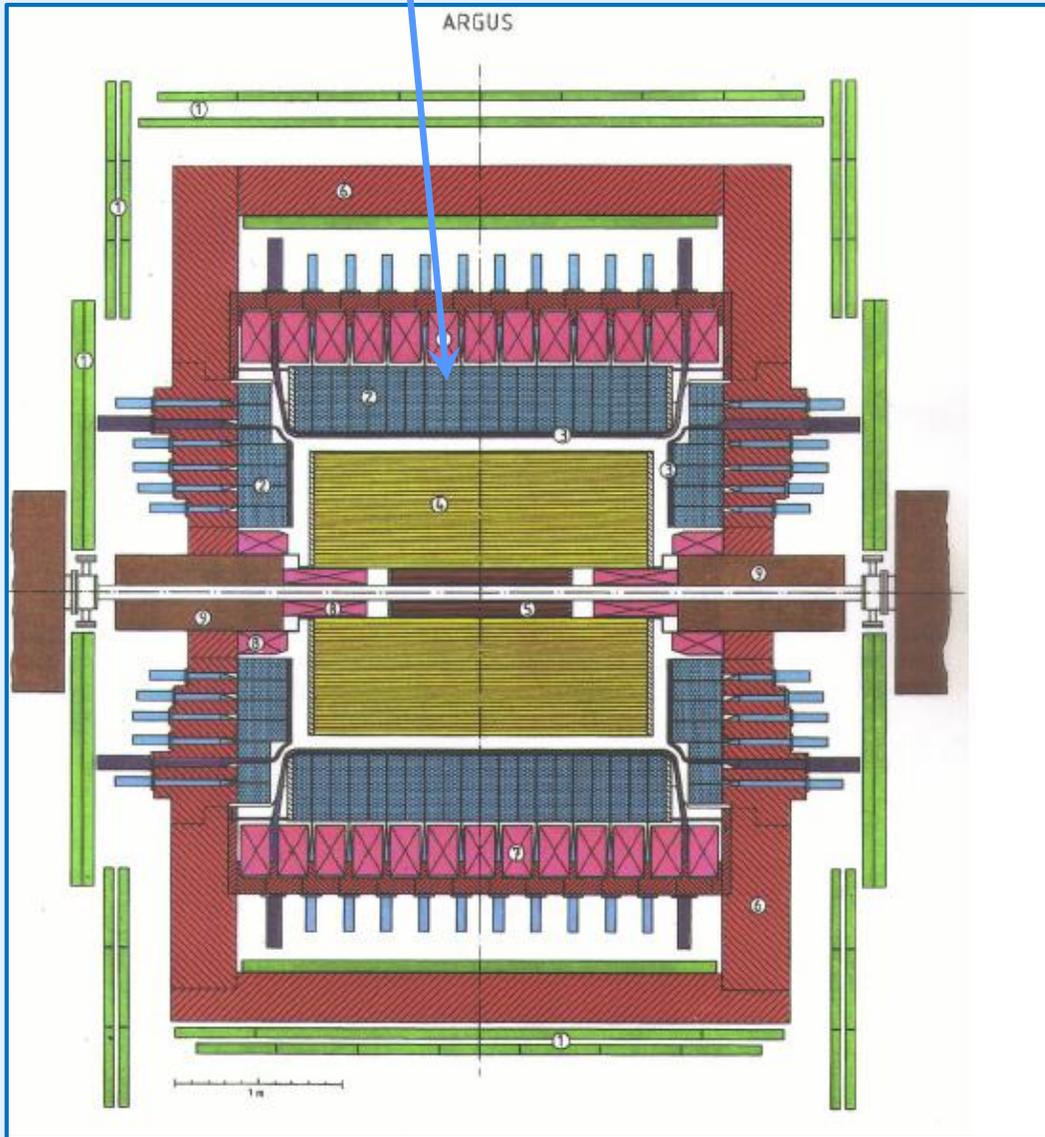
until 1993: Uni Dortmund  
1993 – 1995: McGill Montreal  
1996 – 2003: TU Dresden (Prof.)  
since 2004: TU Dortmund (Prof.)

# DO: The early days – Bernhard's "Diplomarbeit" 1985



# ARGUS Experiment – Bernhard’s “Diplomarbeit” 1985

Dortmund: Lead scintillator sandwich calorimeter



Bernhard’s “diplom” thesis in 1985:  
ECAL testbeam measurements for various module  
types and corresponding MC tuning

$$\sigma_E/E = \sqrt{7^2 + 8^2} \text{ GeV}/E \%$$

# DO: ARGUS Experiment

PhD: 1985 – 1988  
Postdoc: 1989 – 1992

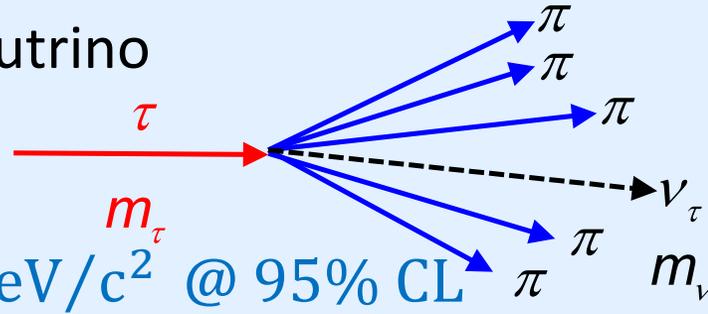


ARGUS at DORIS II  
Facility at DESY.  
Dedicated to charm  
and beauty physics

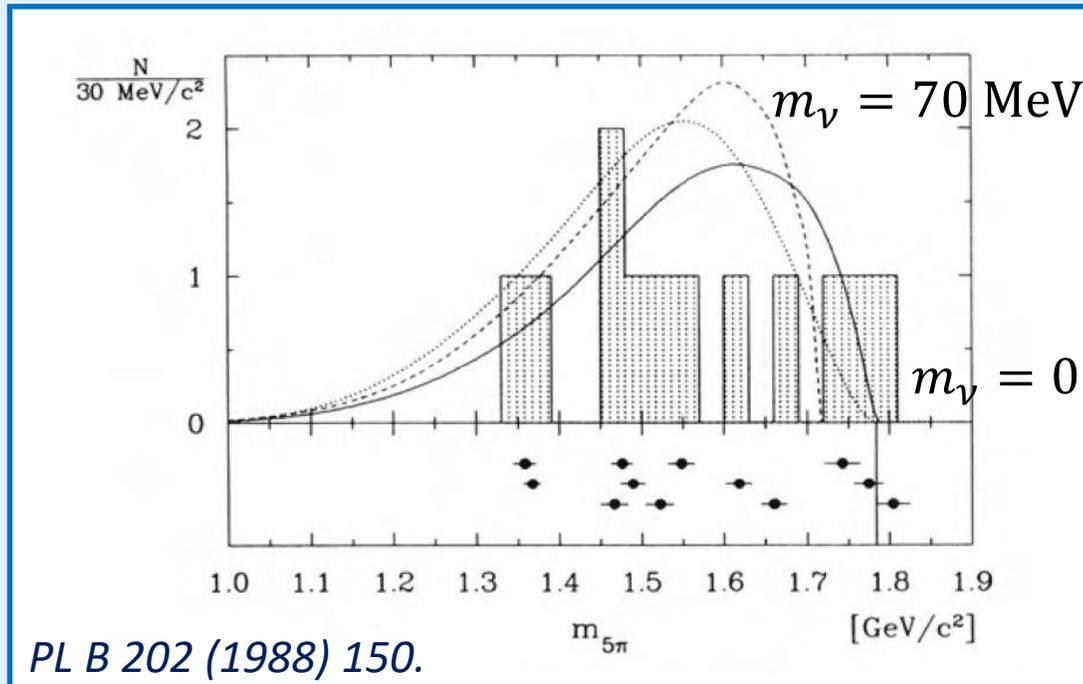
# DO: Bernhard on tau leptons

PhD: 1985 – 1988  
Postdoc: 1989 – 1992

World best tau neutrino  
mass limit:

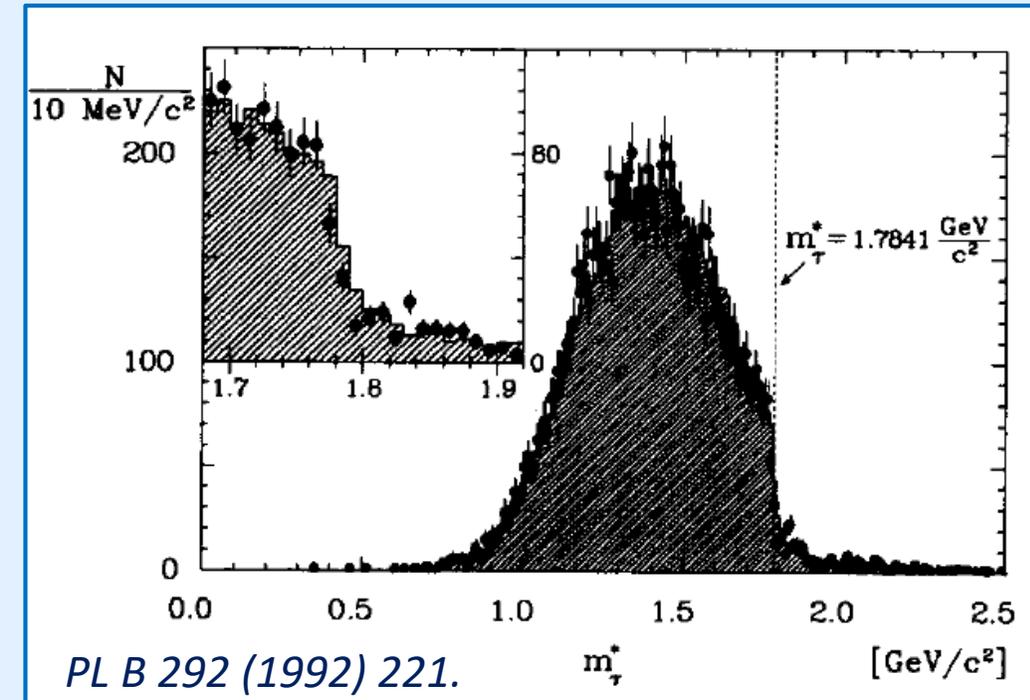
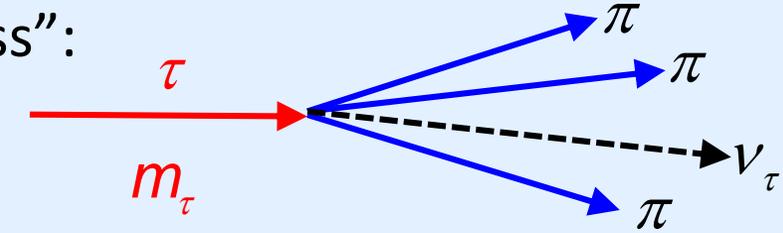


$$m(\nu_\tau) < 35.3 \text{ MeV}/c^2 \text{ @ 95\% CL}$$



Benno-Orenstein-Preis 1988: best  
physics PhD thesis

Tau mass measurement introducing  
“pseudomass”:



$$m_\tau = 1776.3 \pm 2.4 \pm 1.4 \text{ MeV}/c^2$$

# Hard at work in the control room

PhD: 1985 – 1988  
Postdoc: 1989 – 1992

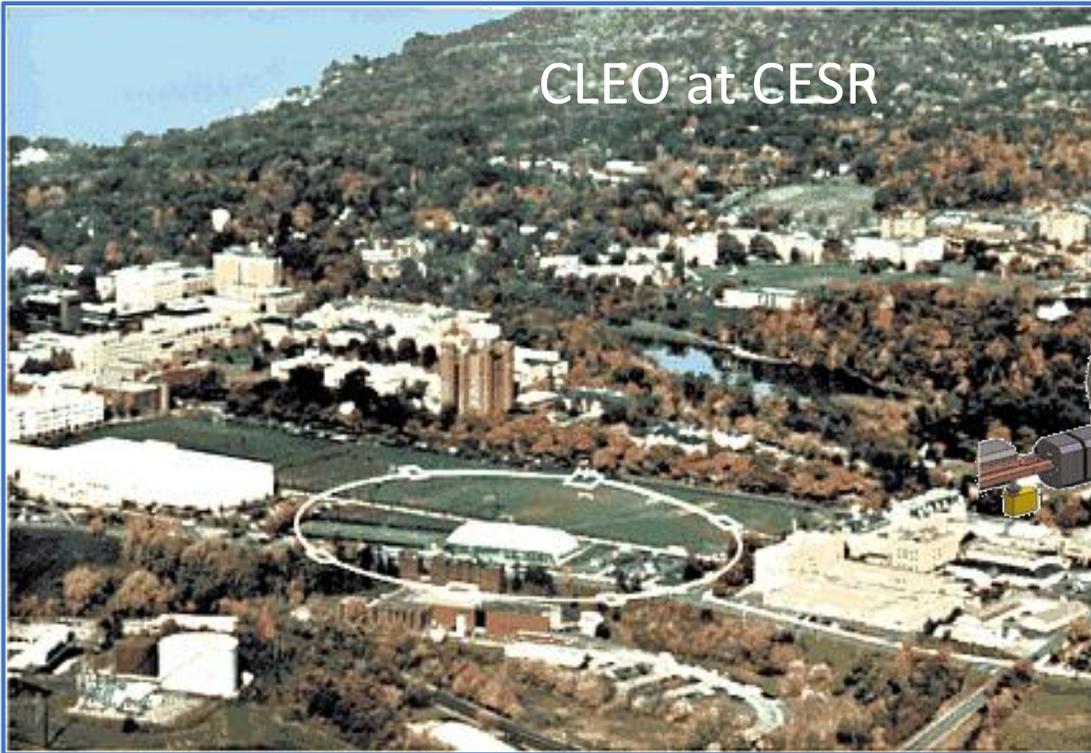






# CLEO and *BABAR*

Senior Research Associate 1993 – 1995  
McGill University, Montreal



- Bernhard participated in CLEO data taking and operations
- Author of the BABAR proposal
  - Prominent contributions for two decades to come!

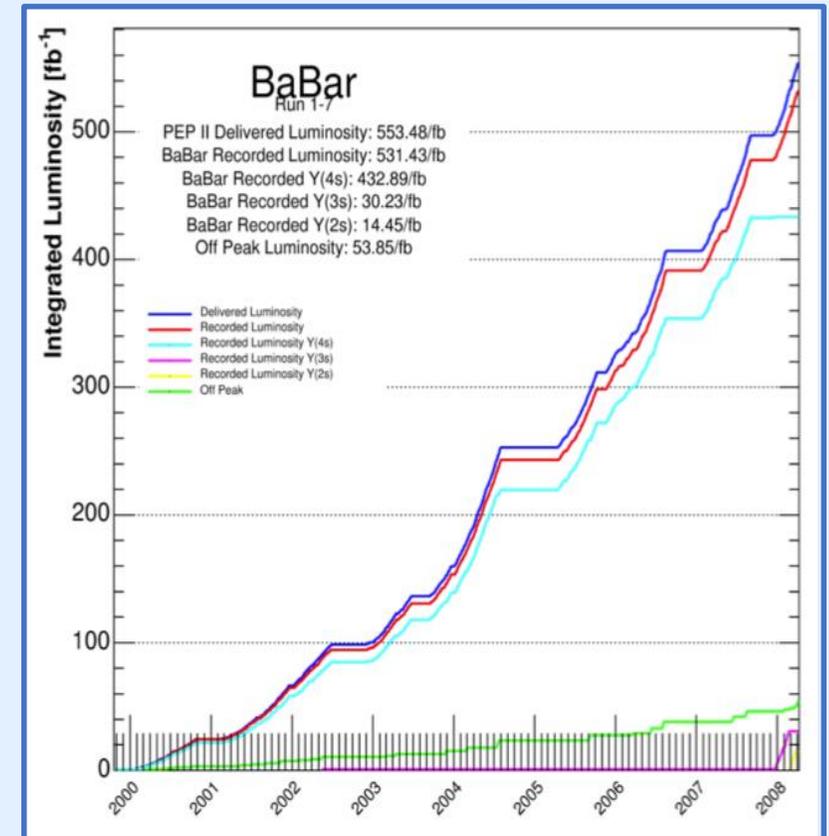
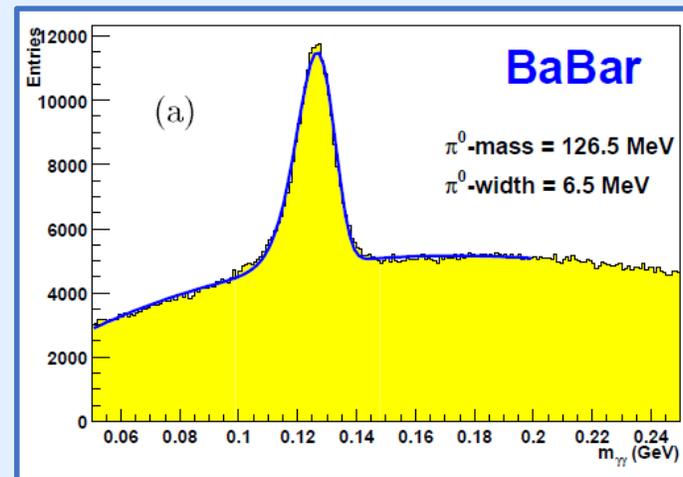
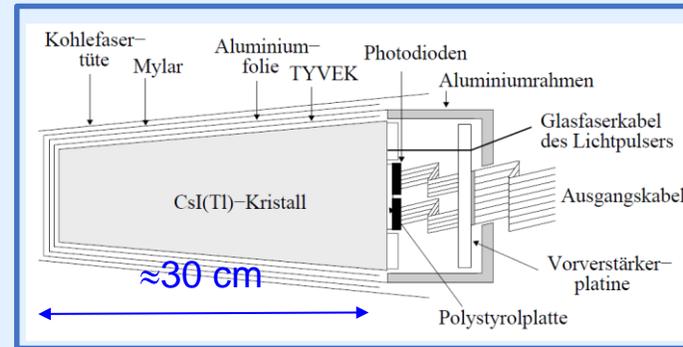
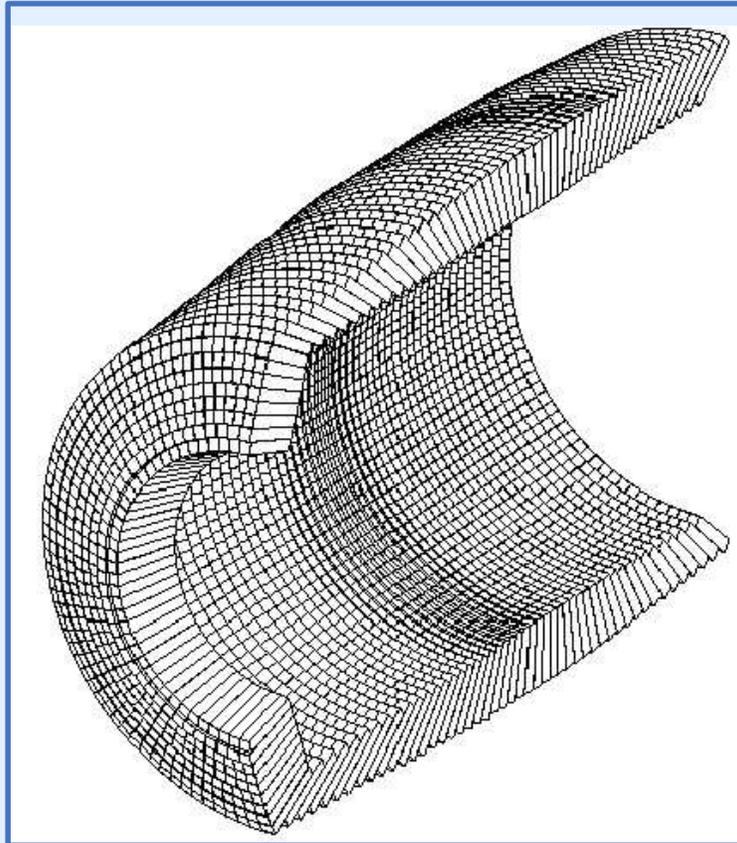


# BABAR Calorimeter

Professor in Physics Prof,  
Univ Dresden, 1996 - 2003



- Built a strong group with many students
  - Construction and Operation Crystal Calorimeter
  - Bernhard pioneered BABAR Tier-A computing centre at GridKa



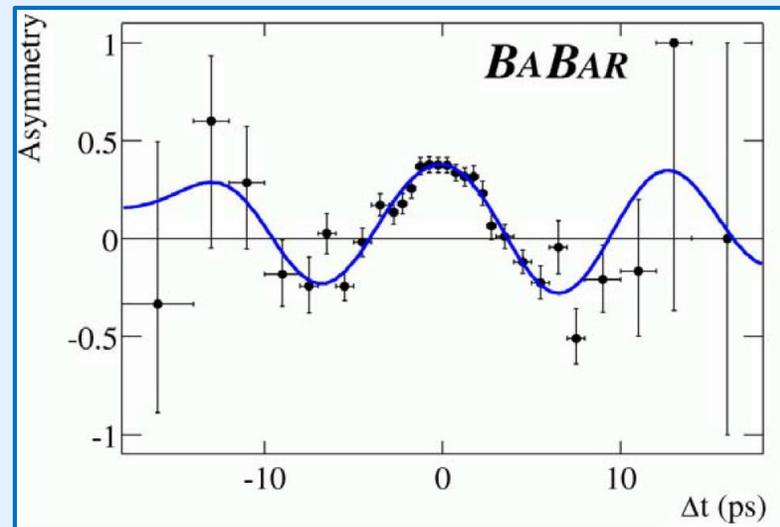
# BABAR and LHCb

Professor in Physics  
Univ Dresden, 1996 - 2003

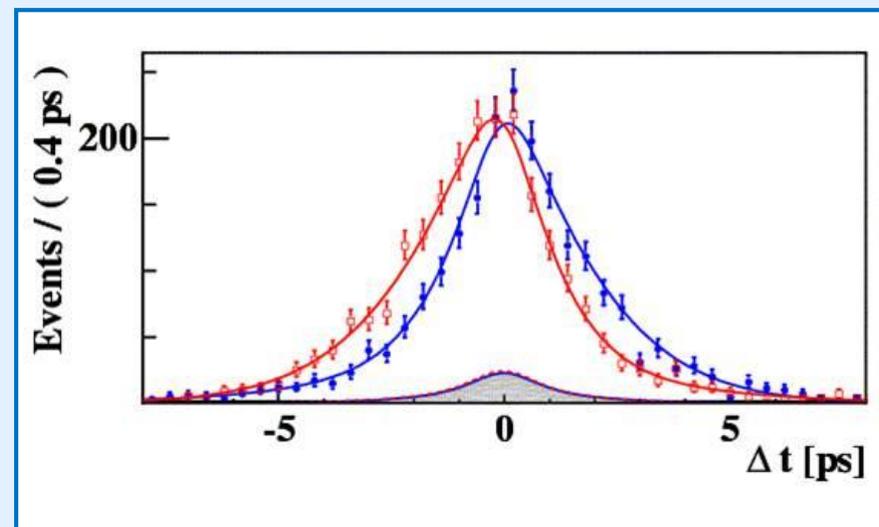
- BABAR:
  - Precision measurements of B-mixing
    - Asymmetric factory gives good time resolution
  - Discovery of CP violation in the B-system

*BABR PR D67 (2003) 072002*

*BABAR, PRL 87 (2001) 091801*



B mixing



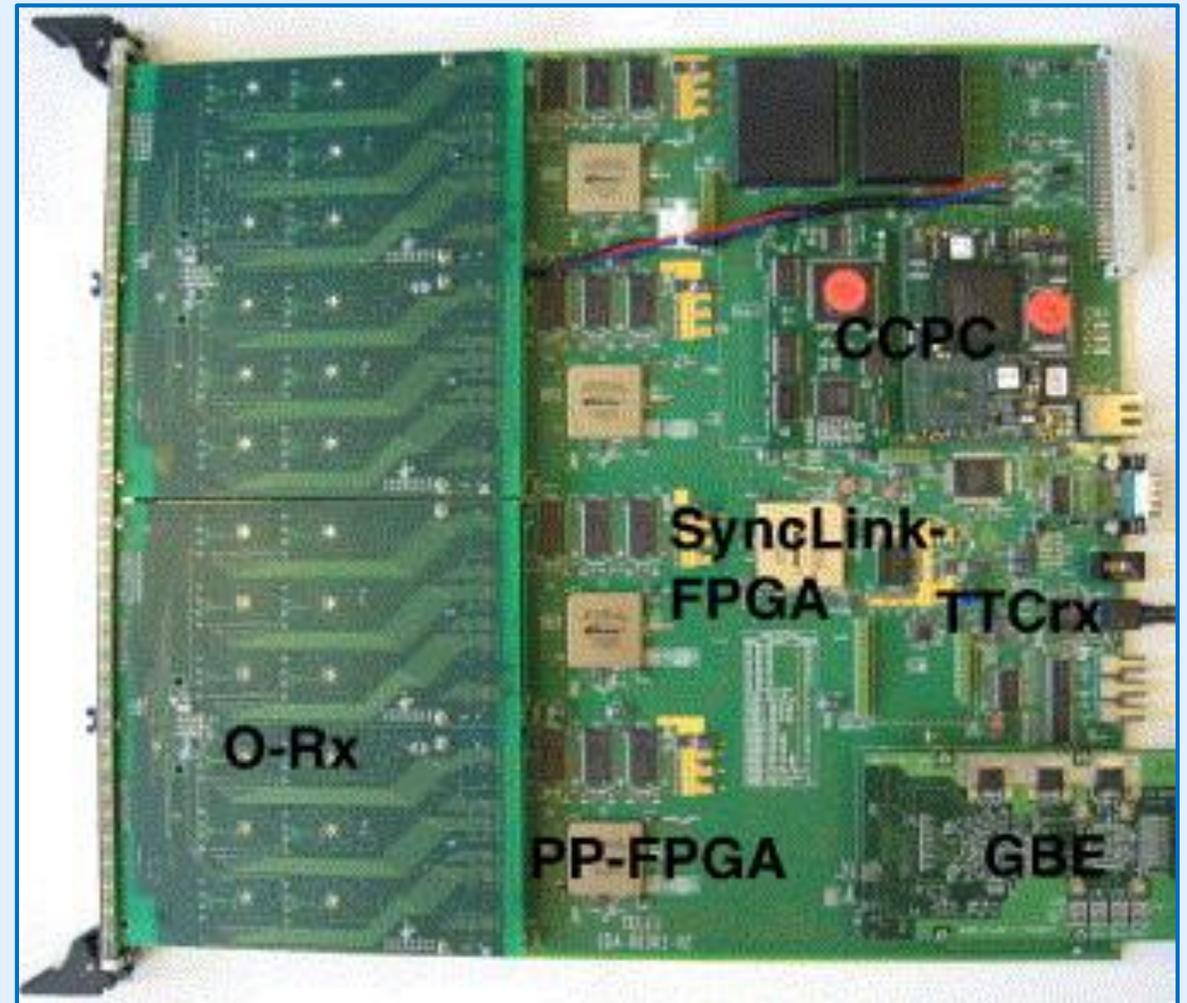
CP violation

- 1998 Author of the LHCb TP

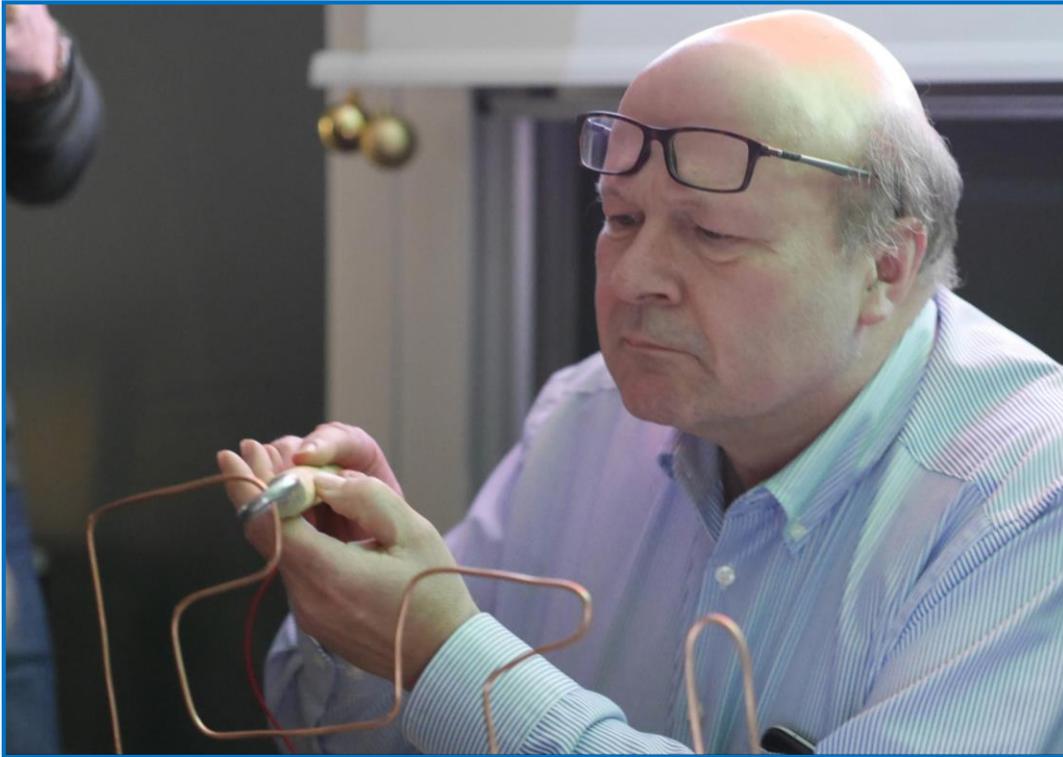
The cover page of the LHCb Technical Proposal. At the top left is the LHCb logo. To its right is the text: 'A Large Hadron Collider Beauty Experiment for Precision Measurements of CP-Violation and Rare Decays'. At the top right is the reference: 'CERN/LHCC 98-4 LHCC/P4 20 February 1998'. In the center, the text 'LHCb' is written in large, red, hand-drawn letters. Below this is a 3D schematic diagram of the detector components, including the interaction region, tracking stations, and calorimeters. At the bottom, the text 'Technical Proposal' is written in bold black letters.



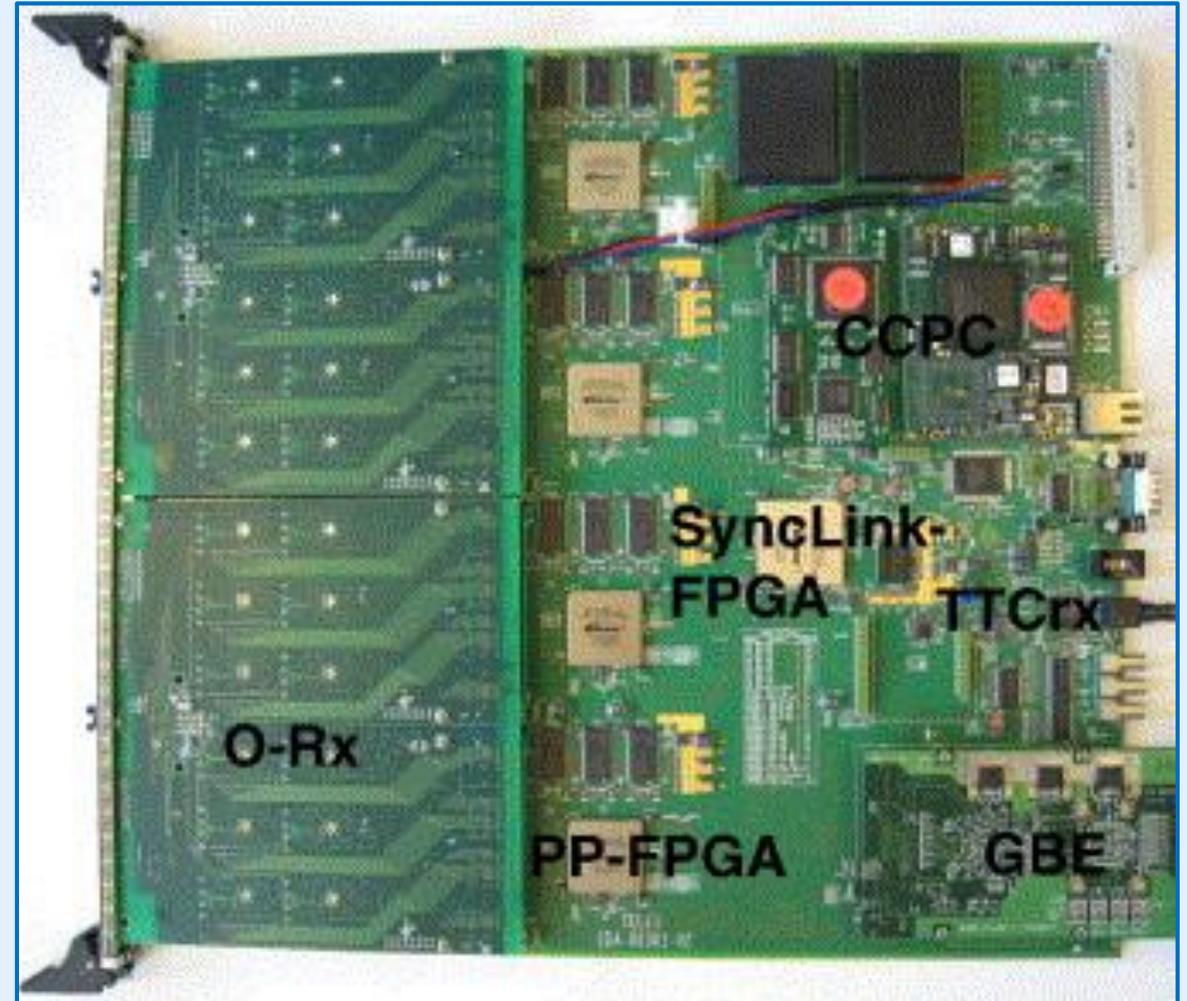
- DAQ contribution to Tell1 Firmware OT



- DAQ contribution to Tell1 Firmware OT



Concentration and focus



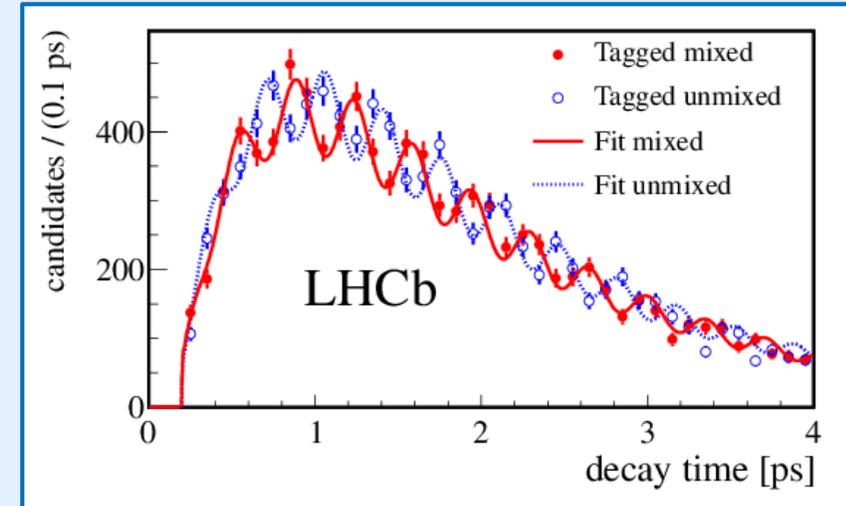
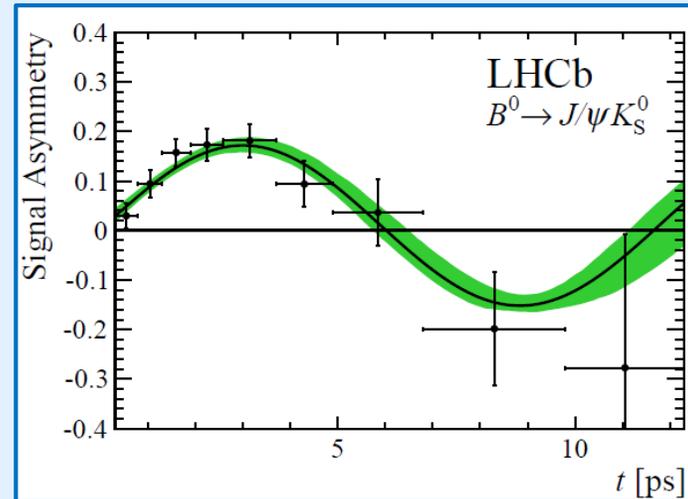
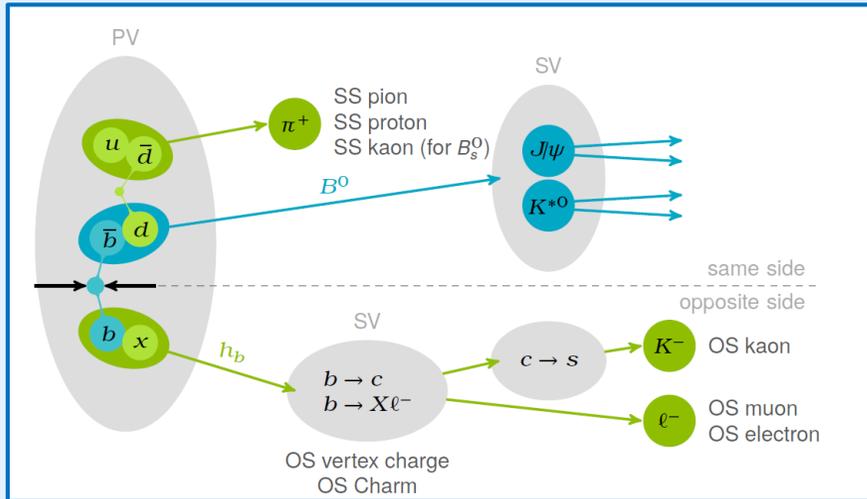
# DO: Building a group at CERN

Professor in Physics,  
TU Dortmund, 2004 - 2021

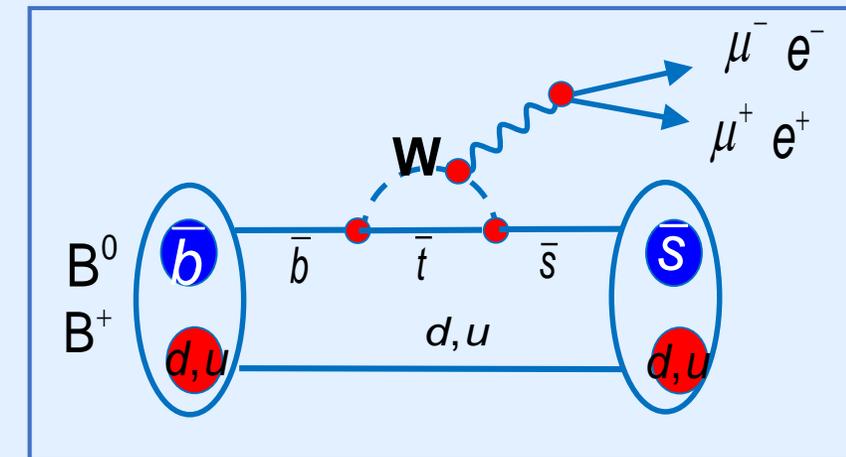
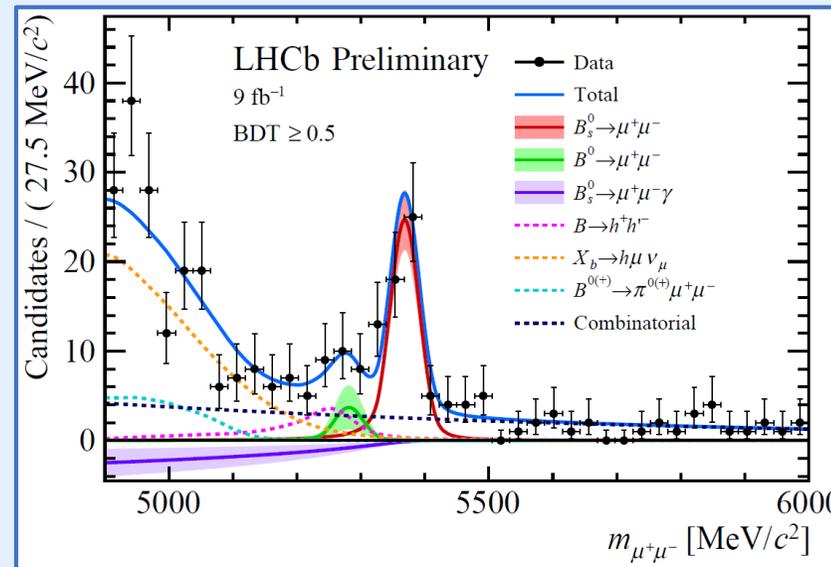


# DO: Physics at LHCb

Professor in Physics,  
TU Dortmund, 2004 - 2021



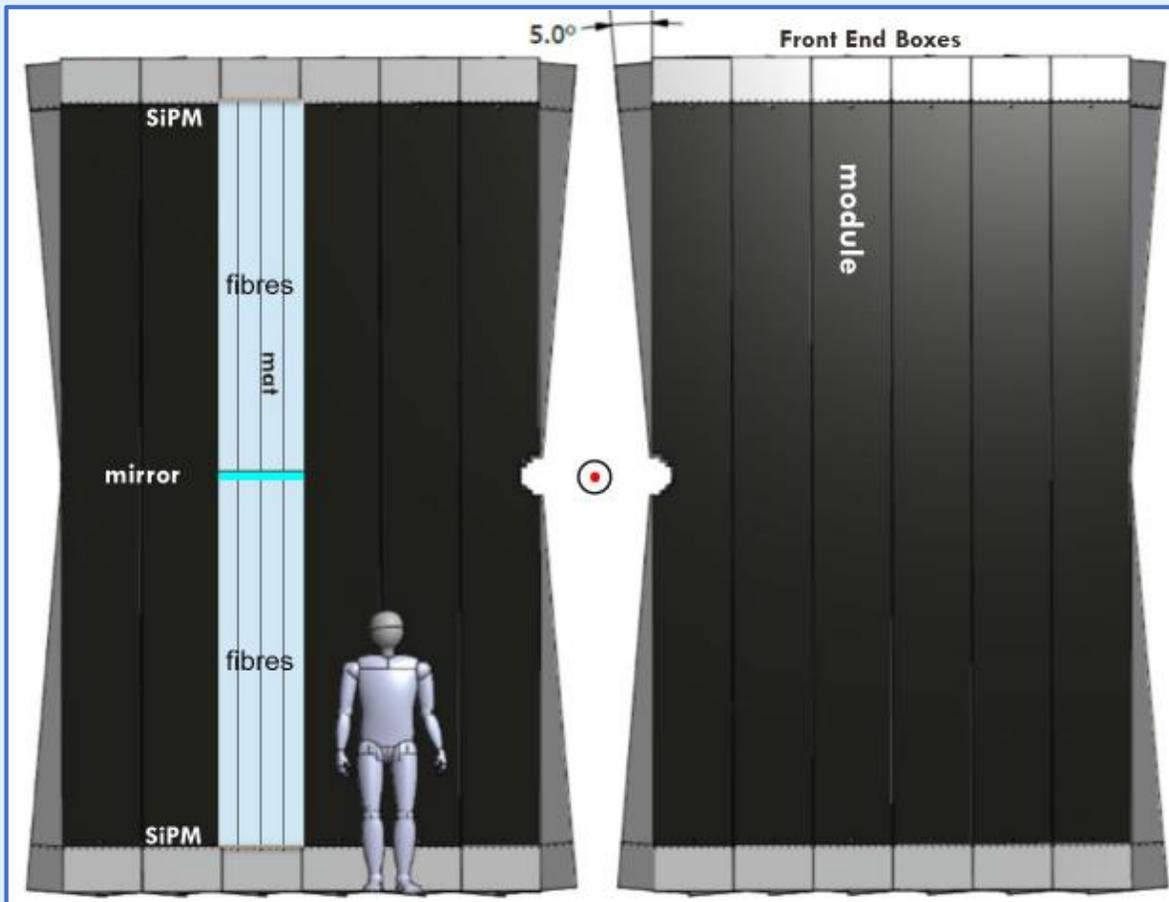
- Flavour Tagging & CP Violation
- Very rare decays
- Universality:  $R_K$



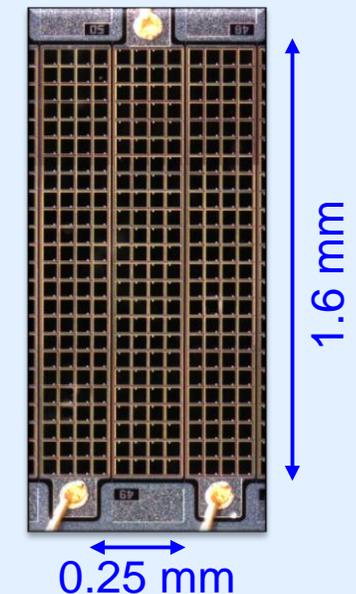
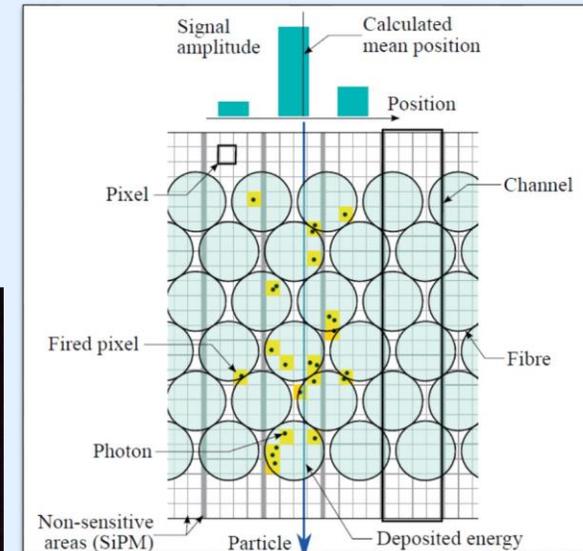
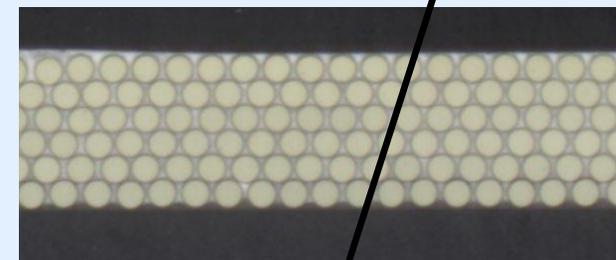
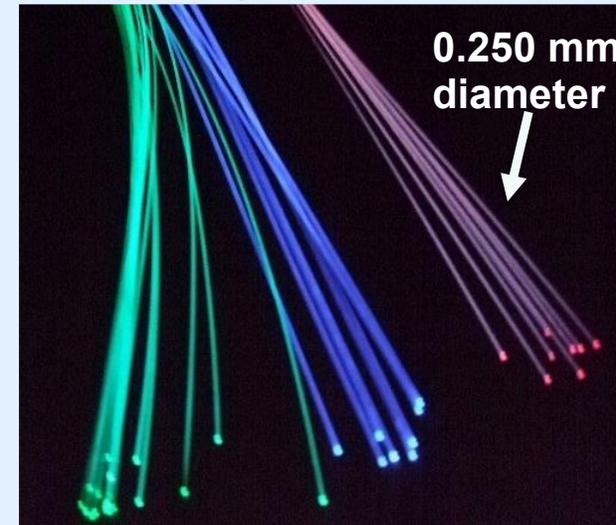
# Upgrade SciFi - Fibers

Professor in Physics,  
TU Dortmund, 2004 - 2021

- Main Fiber protagonists: EPFL & Dortmund
  - Fibermat production 2.5 m long; 13.5 cm wide



## Scintillating fibres



# Fibermat production

Professor in Physics,  
TU Dortmund, 2004 - 2021

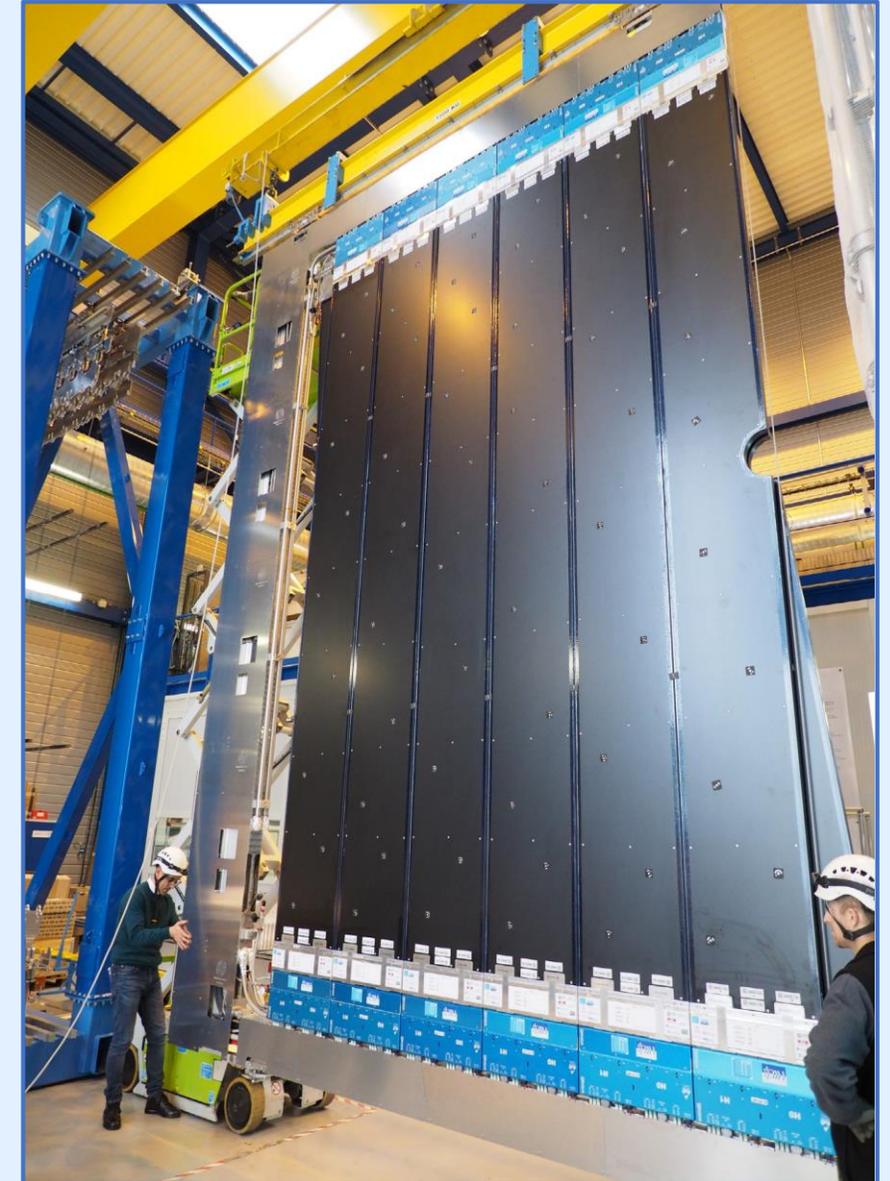
- “Wickelmaschine” for fibers developed in Dortmund
- TU DO produced 1100 mats  $\sim$  3300 km scintillating fibers



# Fibermat production

Professor in Physics,  
TU Dortmund, 2004 - 2021

- “Wickelmaschine” for fibers developed in Dortmund
- TU DO produced 1100 mats  $\sim$  3300 km scintillating fibers



## 2. Bernhard as Colleague & Friend

# Dean of Physics Faculty TU DO

2008 - 2014



Dean of Physics Faculty TU DO

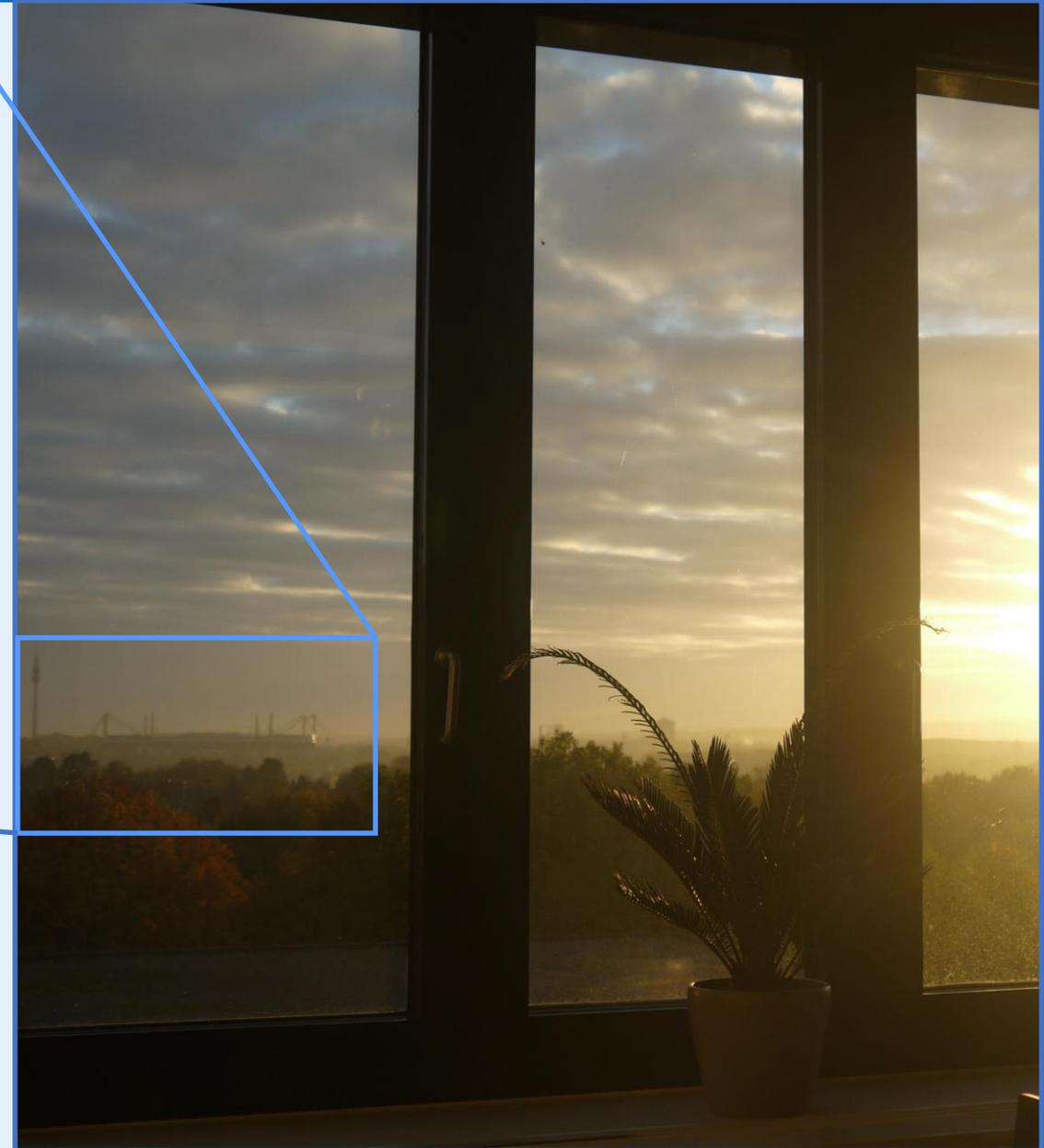
2008 - 2014



# Dean: a new physics building

...with a view

“The greatest stadium in the world”



Indeed Bernhard was a great fan...



Bernhard's "theater of dreams"

# Collaboration Board chair



- 2013 – 2016 Collaboration Board Chair
- 2017 – 2020 MemCo Chair

Bernhard in keywords:

- Dedicated, and caring
- Able to compromise,
- Fully in control,
- Not able to end CB meetings, even though....

# CB chair: Trying to keep the agenda...

## CB Meeting 11.12.13 busy Agenda

Please keep to allocated time!  
We have two choices when to finish:

1.) 19:00h for the LHCb Drink

2.) in time for **the** Match:



MARSEILLE

⋮

BORUSSIA DORTMUND



20:45h

# Poor Bernhard

CB Meeting 26.02.14  
busy Agenda

CB Meeting 18.06.14

CB Meeting 16.09.14

Please keep to allocated time!  
Otherwise, it will be a very late dinner in Paris for some of us!

btw:

It seems that LHCb CB meetings are linked to soccer events:

Liverpool  20:45  Ludogorets

Benfica  20:45  Zenit

Juventus  20:45  Malmö

Olympiacos  20:45  Atlético

Galatasaray  20:45  Anderlecht

Real Madrid  20:45  Basel

Monaco  20:45  Leverkusen

Dortmund  20:45  Arsenal



CB Meeting 25.02.15

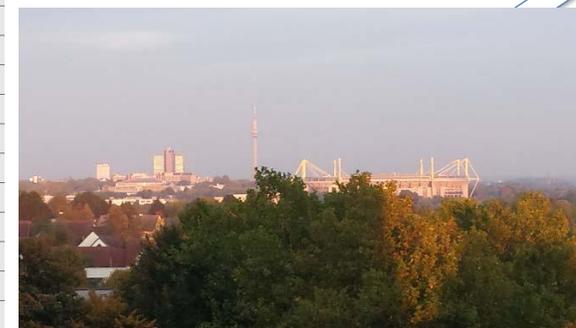
CB Meeting 10.06.15

CB Meeting 09.12.15

18

30.1.15

1		FC Bayern München
2		VfL Wolfsburg
3		Borussia Mönchengladbach
4		FC Schalke 04
5		FC Augsburg
6		Bayer 04 Leverkusen
7		TSG 1899 Hoffenheim
8		Hannover 96
9		Eintracht Frankfurt
10		1. FC Köln
11		1. FSV Mainz 05
12		SV Werder Bremen
13		SC Paderborn 07
14		Sport-Club Freiburg
15		Hertha BSC
16		Hamburger SV
17		VfB Stuttgart
18		Borussia Dortmund



2

9.12.15

1		FC Bayern München
2		Borussia Dortmund
3		Borussia Mönchengladbach
4		Hertha BSC
5		VfL Wolfsburg
6		FC Schalke 04
7		1. FSV Mainz 05
8		Bayer 04 Leverkusen
9		Hamburger SV
10		1. FC Köln
11		FC Ingolstadt 04
12		SV Darmstadt 98
13		Eintracht Frankfurt
14		Hannover 96
15		SV Werder Bremen
16		FC Augsburg
17		VfB Stuttgart
18		TSG 1899 Hoffenheim

# LHCb Week in Spain solves some issues...

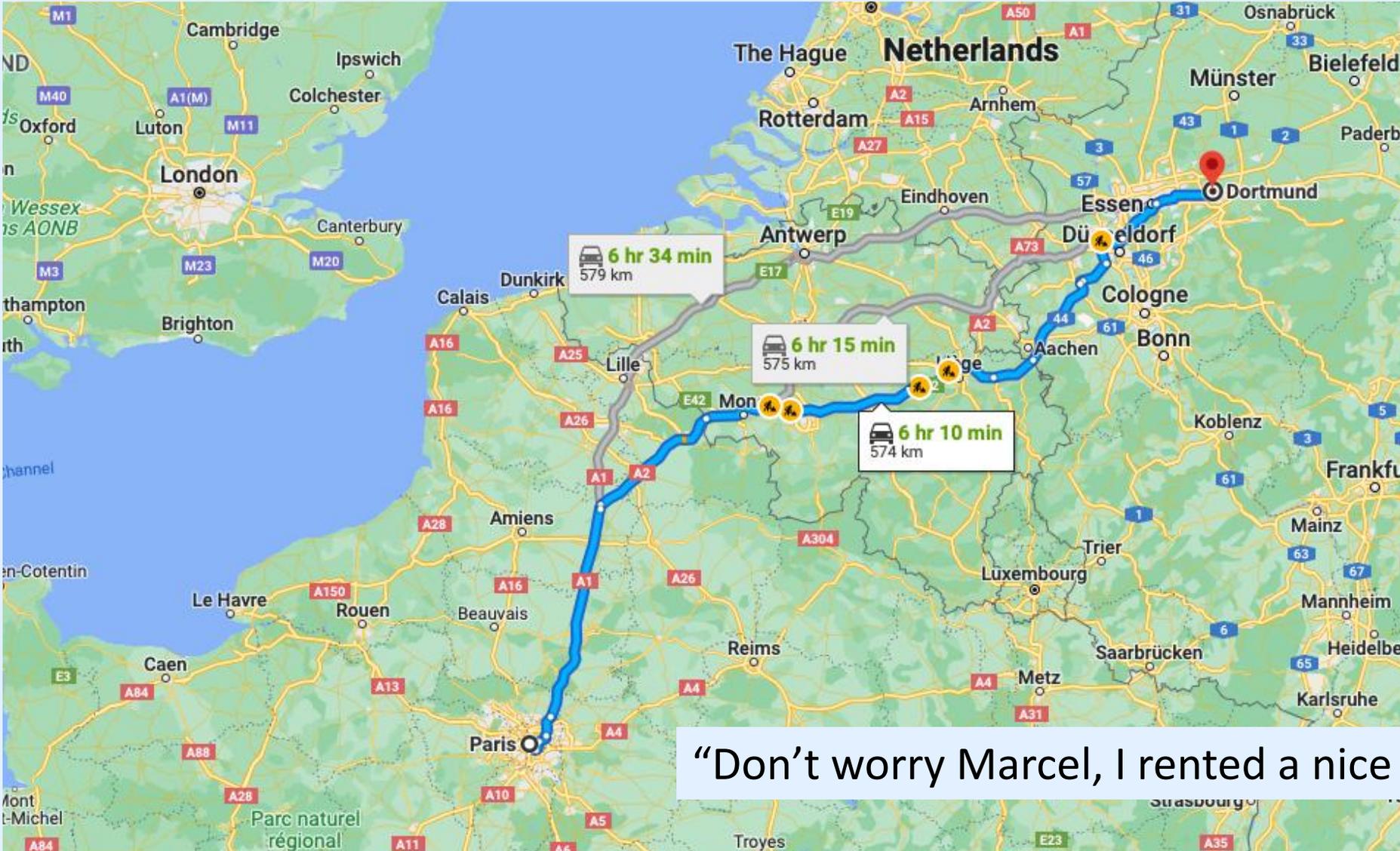
CB Meeting 14.09.16

Please take your time, the good restaurants open late....



# Bernhard's dedication: LHCb week Paris Orsay

Paris → Dortmund and Dortmund → Paris within 24 hours ??



“Don't worry Marcel, I rented a nice car.”

# Bernhard was looking forward to host us



## Proposal to host the 2020 external LHCb week in Dortmund

**Bernhard Spaan & Johannes Albrecht**  
**19. June 2019**



- About 600.000 inhabitants
  - Industrial Metropolis, with interesting steel / coal historical sites
  - Also many beautiful parks, soccer & beer capital
  - People are famously friendly
  - Good, affordable pubs & restaurants (eg Pizza 6-12EUR, beer from 2EUR)



# Finally, personal

- Bernhard was more than friendly to me – he was a real friend
  - We discussed physics, football and life over many dinners and drinks



# Finally, personal

- Bernhard was more than friendly to me – he was a real friend
  - We discussed physics, football and life over many dinners and drinks
- Helpful, wise, visionary and a giant in Physics
- He will be tremendously missed.

