

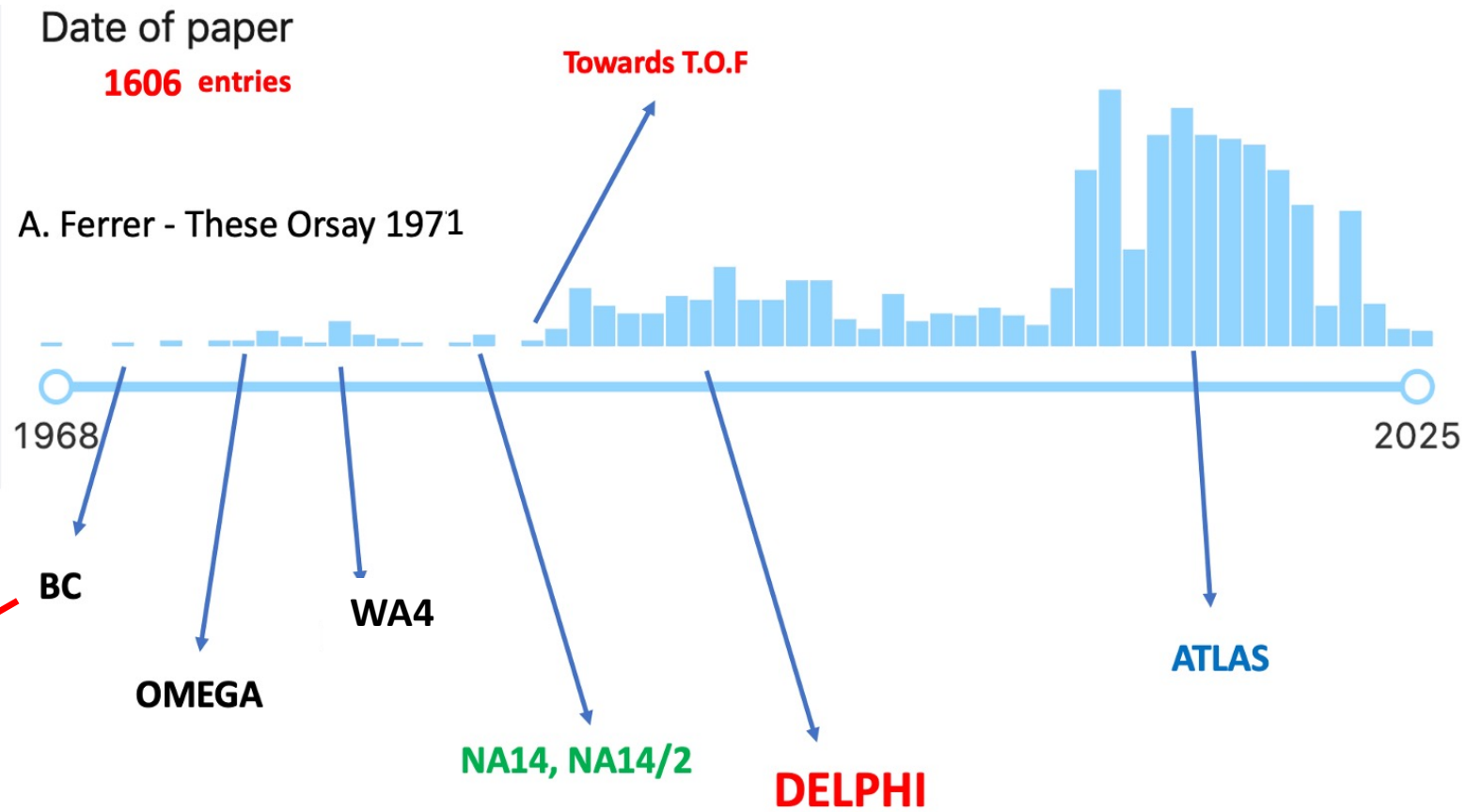
# Souvenirs de Toni

Daniel TREILLE 21 avril 2026

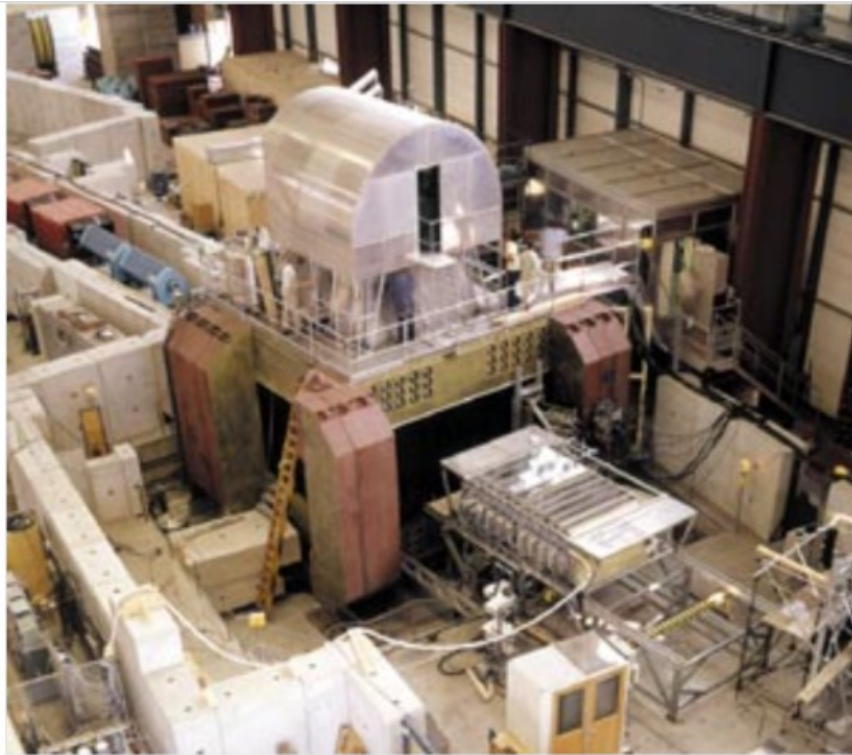
## Panorama de son oeuvre expérimentale qui n'est qu'une partie de son activité scientifique



Toni  
expert de  
software



## Toni with OMEGA spectrometer at PS



### The "fast proton" programme

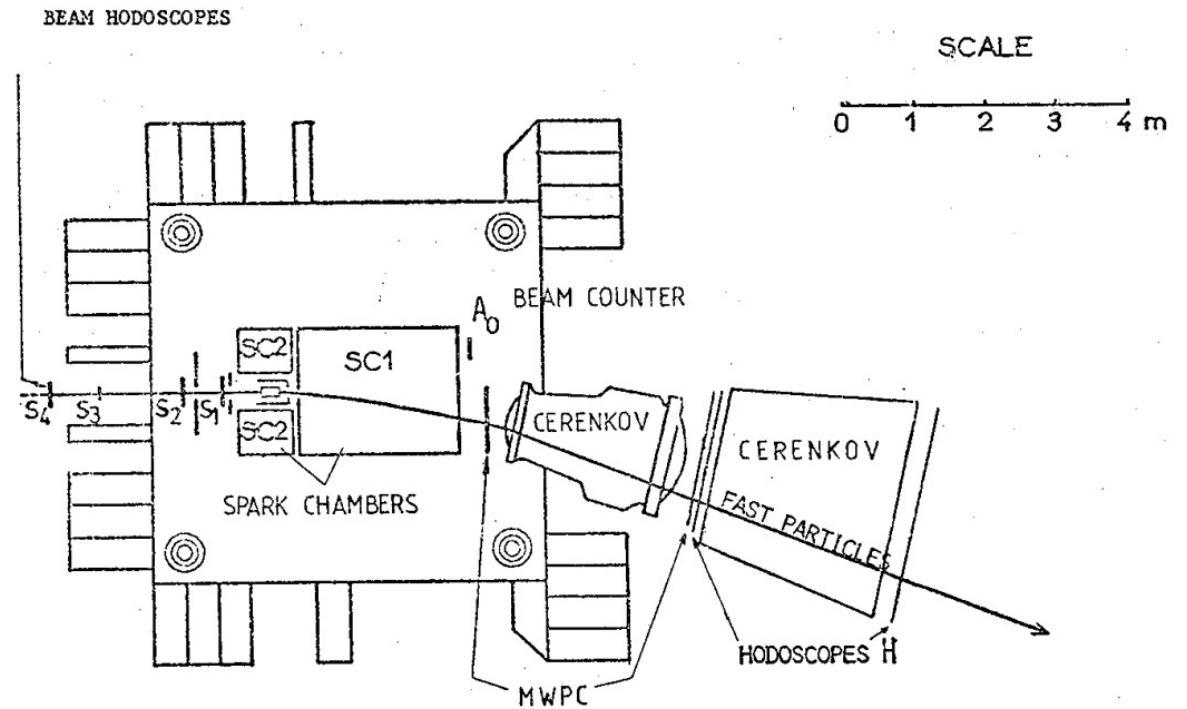
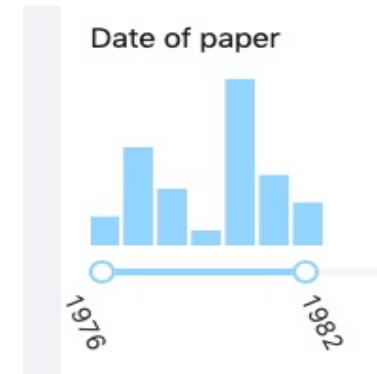
Charm Search in 19-GeV/c  $\pi^-$ -p Exclusive Reactions

Omega Group • B. Ghidini (Bari U. and INFN, Bari) et al. (Apr, 1976)

Published in: *Nucl.Phys.B* 111 (1976) 189 • Contribution to: [International Neutrino Conference 1976](#)

**PS**

### Toni with OMEGA



Toni's work on the Pattern Recognition of Omega Spectrometer

Toni master of software, user of Univac Orsay

## Once upon a time, while studying

BARYON EXCHANGE IN  $\pi^-$  INDUCED TWO-BODY REACTIONS  
AT 9 GeV/c AND 12 GeV/c

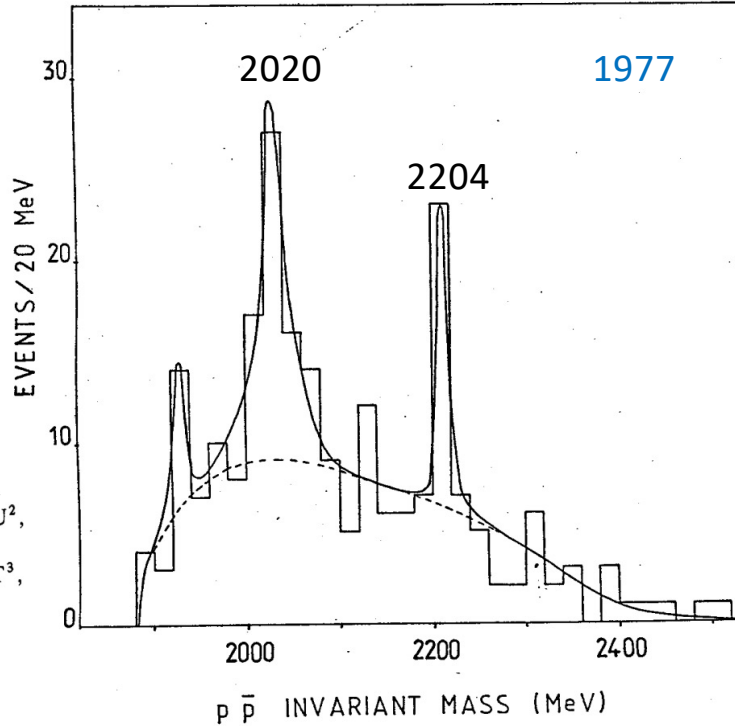
from the study of the reaction  $\pi^- p \rightarrow p_f p \bar{p} \pi^-$   
using a fast proton ( $p_f$ ) trigger a surprise came

EVIDENCE FOR TWO NARROW  $p\bar{p}$  RESONANCES  
AT 2020 MeV AND 2200 MeV

P. BENKHEIRI<sup>1</sup>, J. BOUCROT<sup>2</sup>, B. BOUQUET<sup>2</sup>, P. BRIANDET<sup>1</sup>, B. D'ALMAGNE<sup>2</sup>, C. DANG VU<sup>2</sup>,  
B. EISENSTEIN<sup>1,5</sup>, A. FERRER<sup>2</sup>, P. FLEURY<sup>1</sup>, B. GROSSETÊTE<sup>2,6</sup>, G. IRWIN<sup>1</sup>,  
A. JACHOLKOWSKI<sup>2,7</sup>, A. LAHELLEC<sup>2</sup>, H. NGUYEN<sup>2</sup>, P. PETROFF<sup>2</sup>, F. RICHARD<sup>2</sup>, P. RIVET<sup>3</sup>,  
G. De ROSNY<sup>1</sup>, P. ROUDEAU<sup>2</sup>, A. ROUGÉ<sup>1</sup>, M. RUMPF<sup>1</sup>, J. SIX<sup>2</sup>, J.M. THÉNARD<sup>1,8</sup>,  
D. TREILLE<sup>4</sup>, A. VOLTE<sup>3</sup>, D. YAFFÉ<sup>4</sup>, T.P. YIOU<sup>4,9</sup>, H. YOSHIDA<sup>2</sup>  
CERN, Collège de France, Ecole Polytechnique, Orsay Collaboration

### Sensitivity of a few events/ $\mu\text{b}$

Incident Momentum GeV/c	Mass (MeV)	Width (MeV)
9	2020 $\pm$ 3	24 $\pm$ 12
12		
9	2204 $\pm$ 5	16 $\begin{smallmatrix} +20 \\ -16 \end{smallmatrix}$
12		



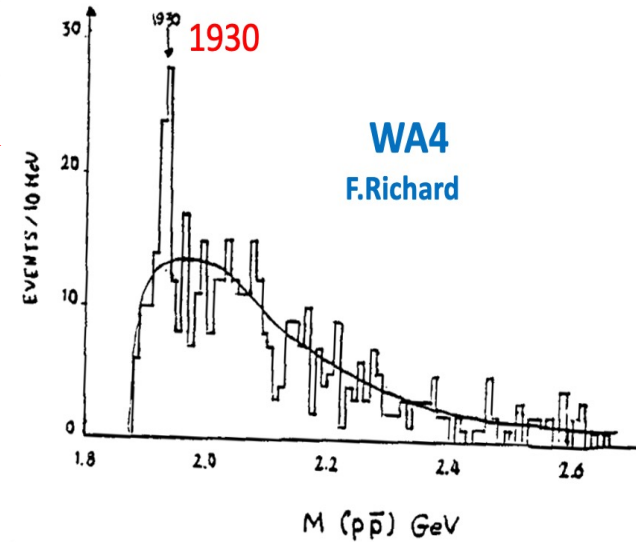
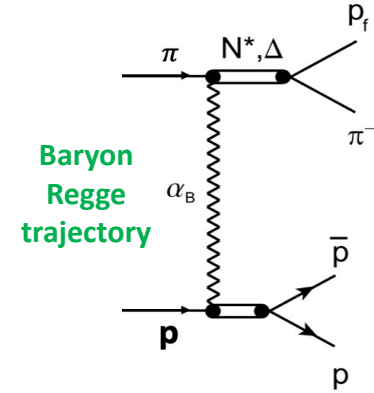
The distribution of the  $p\bar{p}$  invariant mass with  $\cos\vartheta < 0$  and  $1175 < M(p_f \pi^-) < 1300$  MeV for the sample of the two 9 + 12 GeV/c runs.

However several further searches did not see these spikes...

1983: 2.02 seen in  $N\bar{N}$  charged at SLAC Phys.Lett. volume 122B, number 5,6 (1983)471

So confused situation concerning baryonium spectroscopy !

high production of  $\Delta(1232)$  and  $N(1520)$  observed in the  $p_f \pi^-$  system



The mass spectrum in inclusive  $p\bar{p}$  photoproduction

# Toni's continuity of thought ! De la suite dans les idées ! Responsabilité et ténacité

Proposal to Study  $N\bar{N}$  States Produced via Baryon Exchange  
in  $\pi^+p$  Interactions using the Omega Prime Spectrometer

**WA56** A. Ferrer<sup>+</sup>, J.M. Gago<sup>\*\*</sup>, P. Sonderegger **et al** (1978)  
**spokesperson**

**Excellent detector, acceptance, identification: constraints applied**

Comprehensive evidence about a narrow  $p\bar{p}$  state of  
mass  $2.02 \text{ GeV}/c^2$

A. Ferrer<sup>1</sup>, A. A. Grigoryan<sup>2</sup>, V. F. Perepelitsa<sup>3,4</sup>, P. Sonderegger<sup>4</sup> CERN/EP/98-66  
May 5, 1998

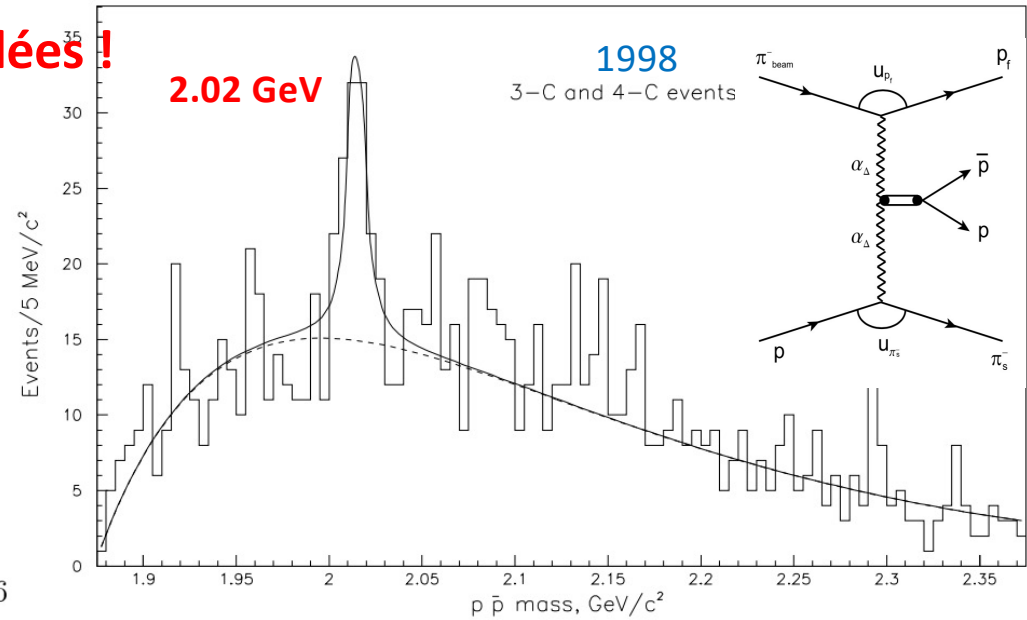


Figure 7

We report **evidence for the existence of a narrow  $p\bar{p}$  state with a mass of  $2.02 \text{ GeV}/c^2$**  and a width below  $10 \text{ MeV}/c^2$  produced in  $\pi^+p$  ( $\pi^-p$ ) interactions at 20 (12)  $\text{GeV}/c$  in six final states, proceeding via baryon exchange mechanism. An agreement is found between our results and an earlier observation of this state, and **an explanation is given why it was not seen in several other experiments.**

## Further investigation of a narrow p anti-p state of mass 2.02-GeV

A. Ferrer (Valencia U.), A.A. Grigorian (Yerevan Phys. Inst.), V.F. Perepelitsa (Moscow, ITEP), P. Sonderegger (CERN) (1999)

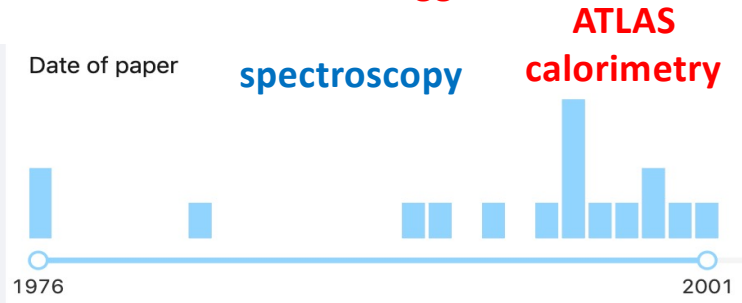
Published in: *Frascati Phys.Ser.* 15 (1999) 441-448 • Contribution to: *Workshop on Hadron Spectroscopy (WHS 99)*, 441-448

## New evidence for a narrow p anti-p state of mass 2.02-GeV/c\*\*2

A. Ferrer (Valencia U.), A.A. Grigorian (Yerevan Phys. Inst.), V.F. Perepelitsa (Moscow, ITEP), P. Sonderegger (CERN) (1993)

Published in: *Nucl.Phys.A* 558 (1993) 191C-200C • Contribution to: *LEAP 92: 2nd Biennial Conference on Low-energy Antiproton Physics*, 191C-200C

Toni et P.Sonderegger



**What is it ? Baryonium ? Hexaquark ? Kaluza-Klein state (hep-ph/0502153) ?**

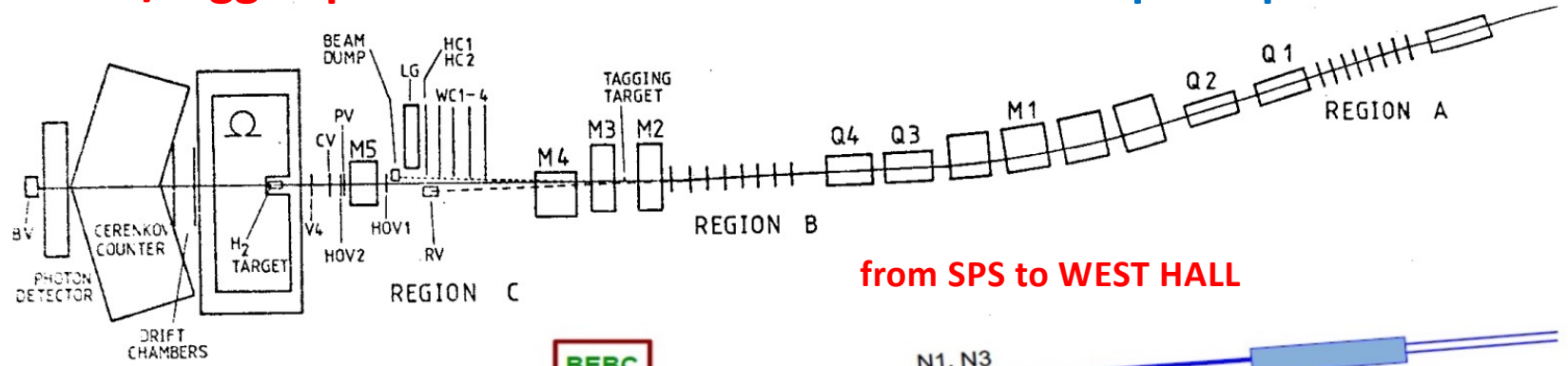
# Toni and SPS, The electron/tagged photon beam to OMEGA with WA4

# CHARM photoproduction

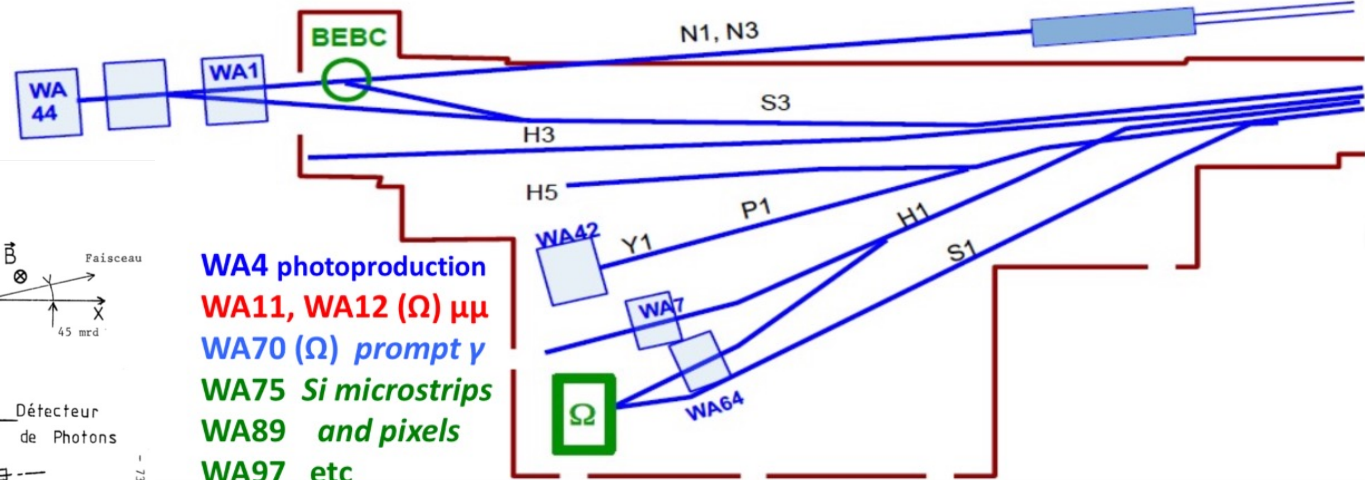
Date of paper



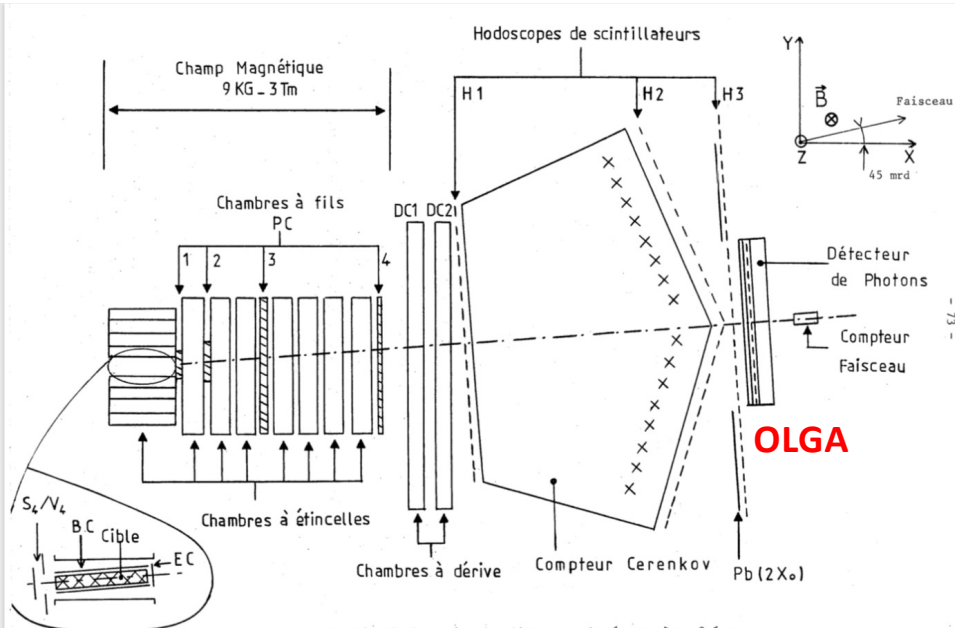
F.Richard



from SPS to WEST HALL



- WA4 photoproduction
- WA11, WA12 (Ω) μμ
- WA70 (Ω) prompt γ
- WA75 Si microstrips
- WA89 and pixels
- WA97 etc



OLGA

Fig. 15 : Implantation des détecteurs du spectromètre Oméga

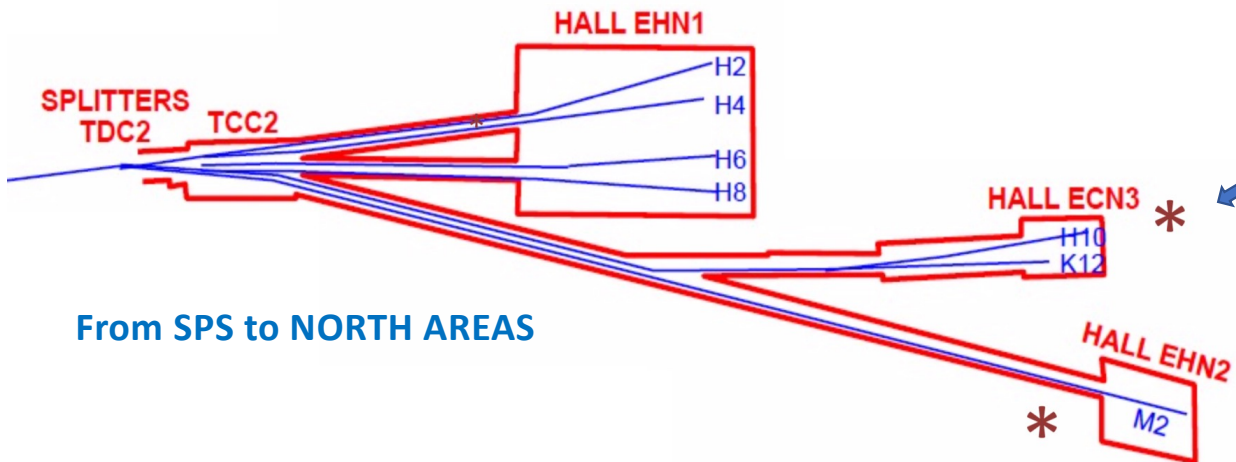
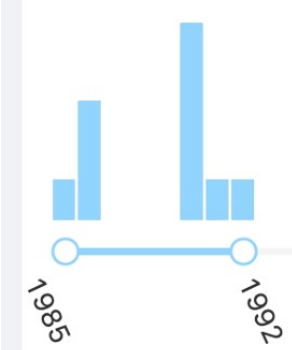
Photoproduction of Charmed *D* Mesons at  $\gamma$  Energies of 40-GeV to 70-GeV

Bonn-CERN-Ecole Poly-Glasgow-Lancaster-Manchester-Orsay-Paris-Rutherford-Sheffield Collaboration

Published in: *Phys.Lett.B* 94 (1980) 113-117

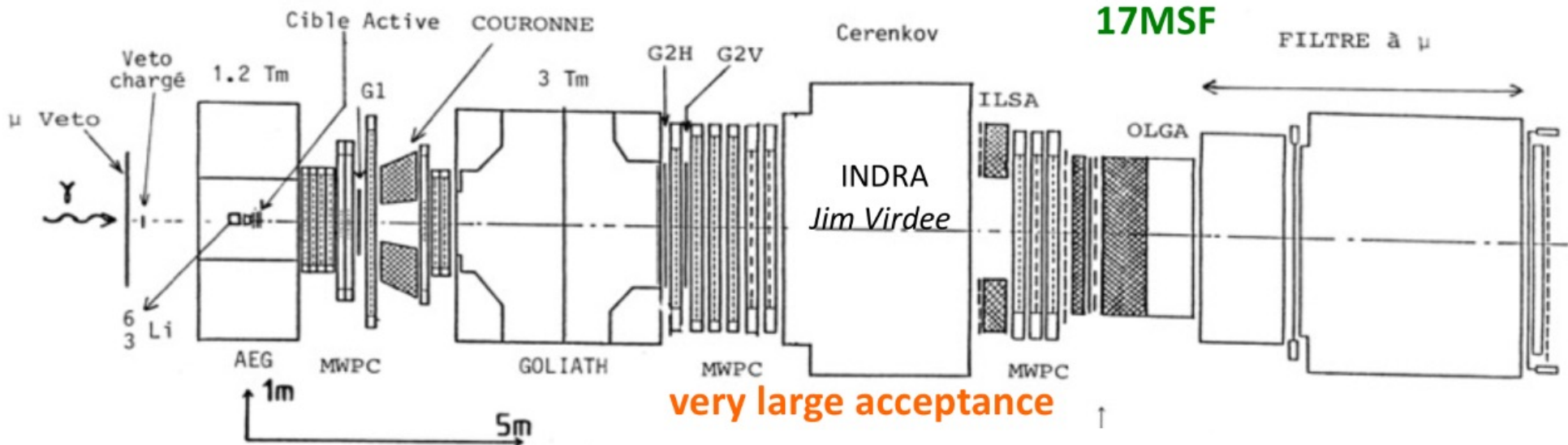
New vector mesons recurrences. Estimate of charm photoproduction cross-section (prompt e,  $\bar{D}^0$ ). Evidence for F production. Emulsion experiment measuring a  $\bar{D}^0$ .

Toni and SPS, North Area **NA14** Hard photoproduction QED and QCD Compton effects on quarks



From SPS to NORTH AREAS

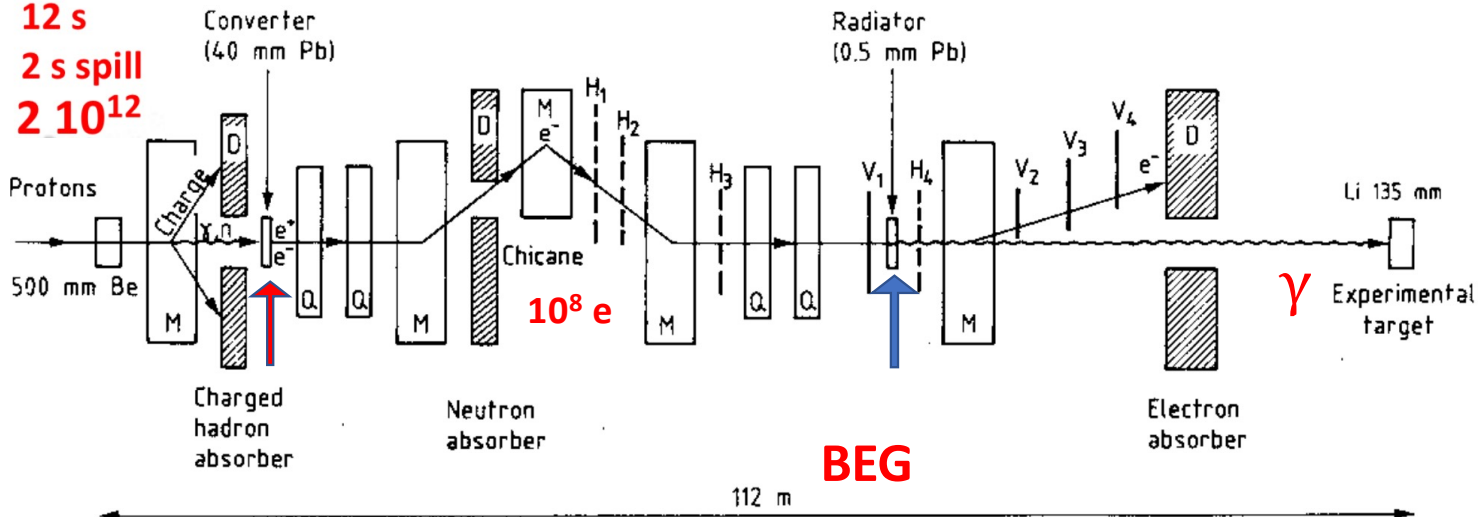
NAHIF Surprise !



NA14 spectrometer

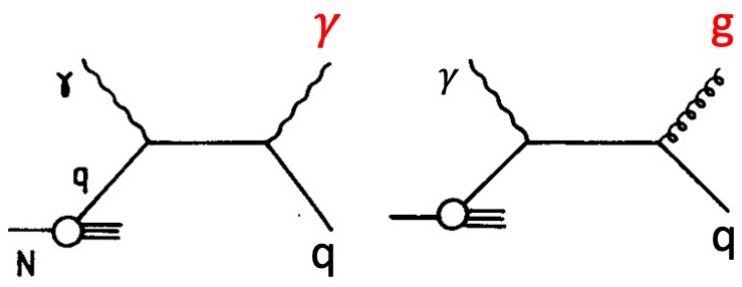
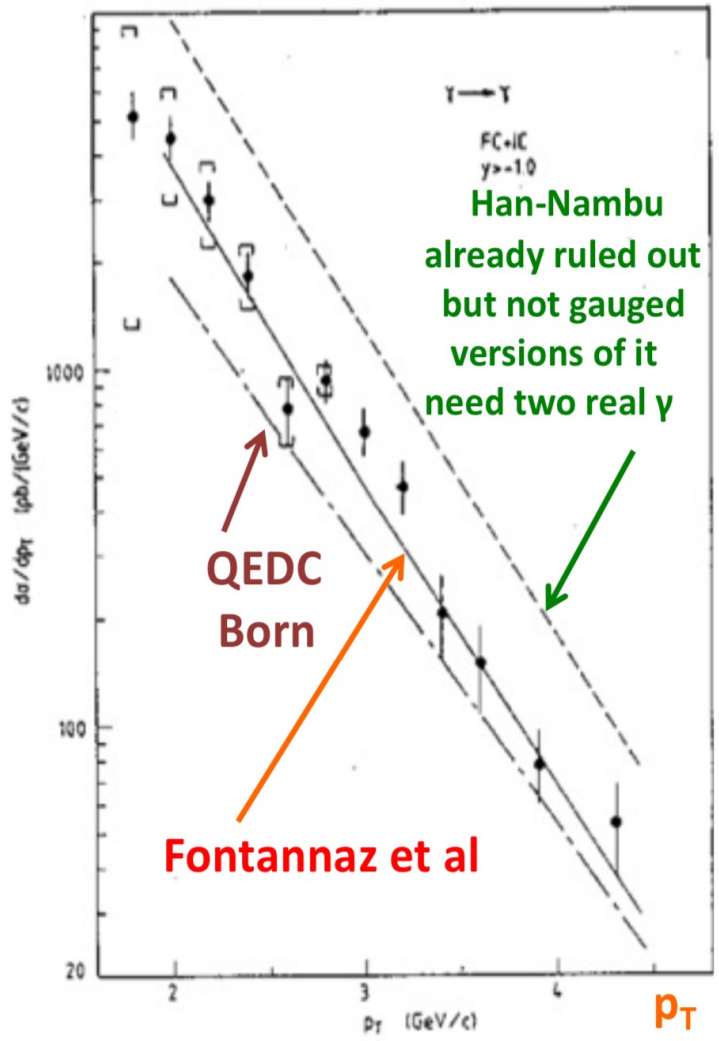
# QED and QCD Compton effects on quarks

450 GeV  
12 s  
2 s spill  
 $2 \cdot 10^{12}$



Toni's work on the online monitoring of the NA14 high energy photon beam

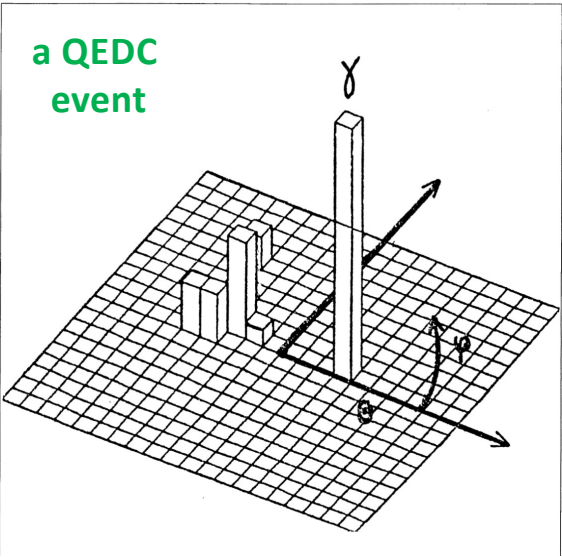
5 publications



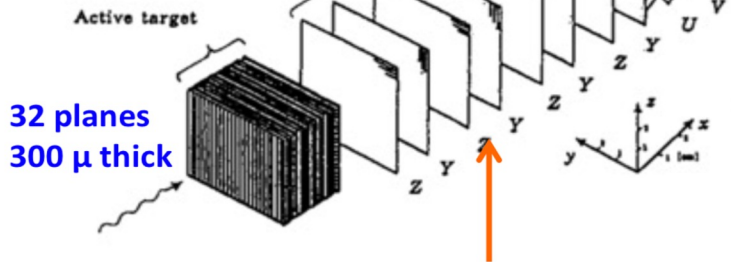
QEDC

QDC

interest in higher orders



# NA14/2 R.Barate charm

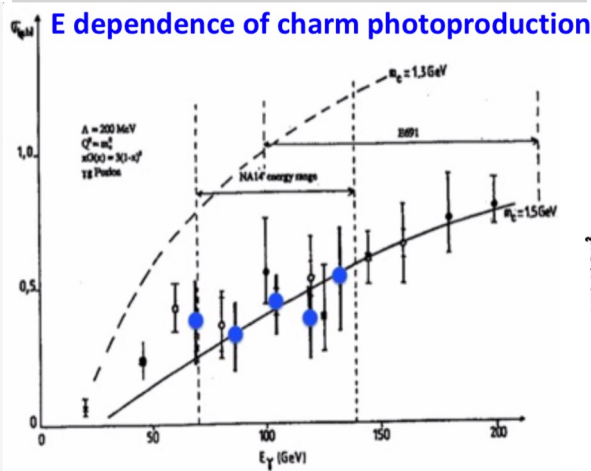
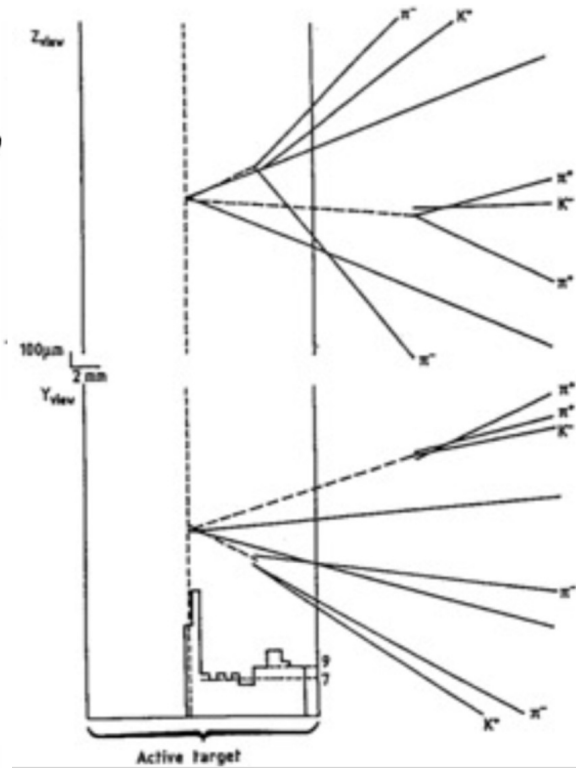


32 planes  
300  $\mu$  thick

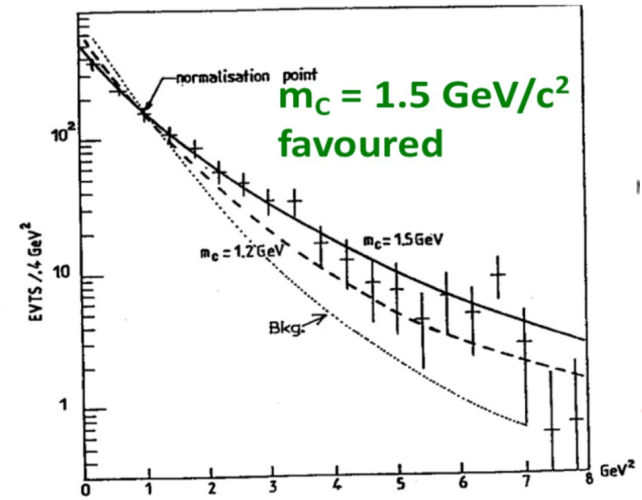
10 planes of Si 5 x 5 cm<sup>2</sup> 460  $\mu$ m thick  
1000 diode strips/plane 50  $\mu$ m pitch  
Planes in pairs with strips orthogonal  
Third projection required



D.Websdale, P.Borgeaud et al



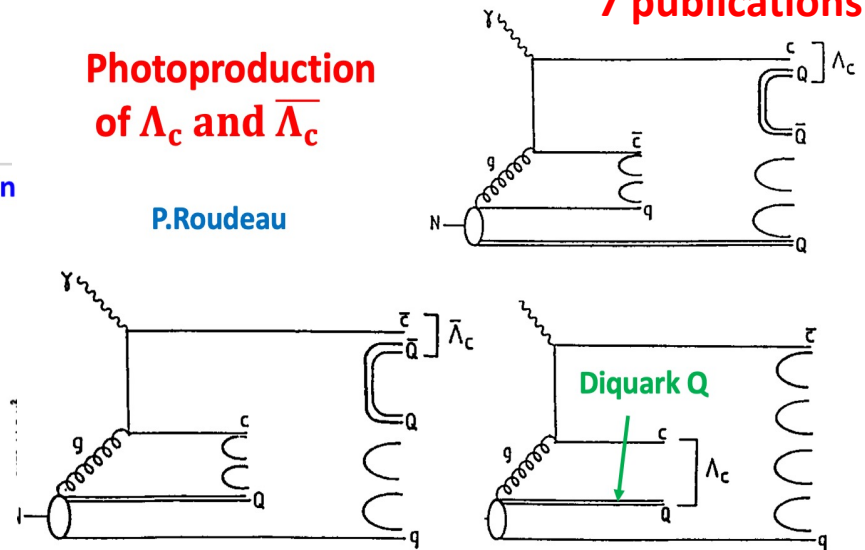
## $p_T$ distribution of D-mesons



lifetimes,  
branching  
ratios,  
Cabibbo-  
suppressed,  
 $D_S^\pm, \Lambda_c$   
production  
mechanisms,  
 $J/\psi$  and  $\psi'$

## Photoproduction of $\Lambda_c$ and $\bar{\Lambda}_c$

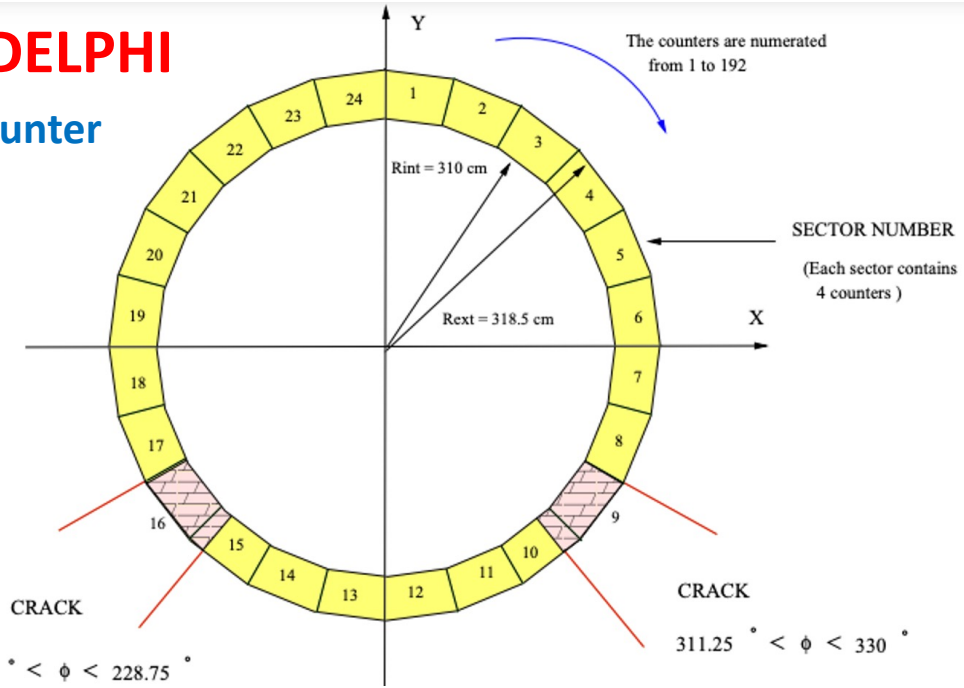
P.Roudeau



Emulsions ? LOI 1986, Chernobyl 1986 !

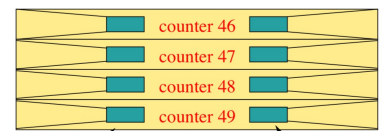
# Toni with DELPHI

## The TOF counter



**Radius : 3.1-3.18 m**  
**Length: 2 x 3.5 m**  
**344 photomultipliers,**  
**ADC,TDC**

Sector composition

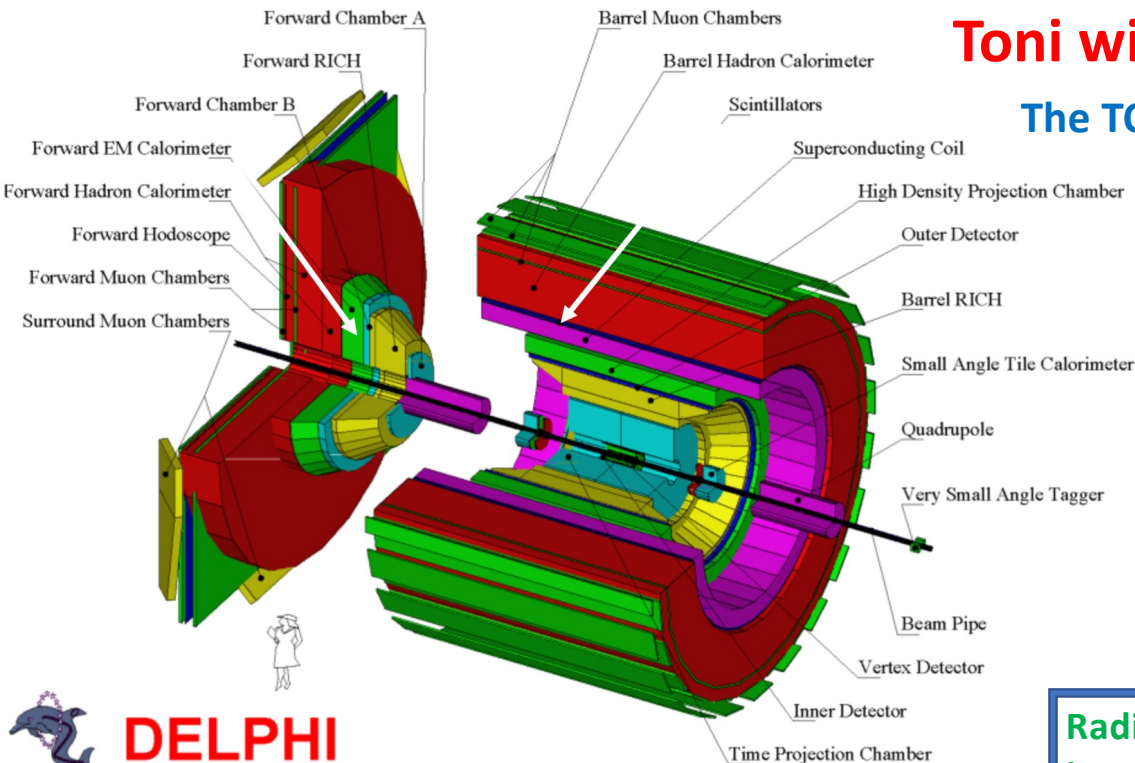
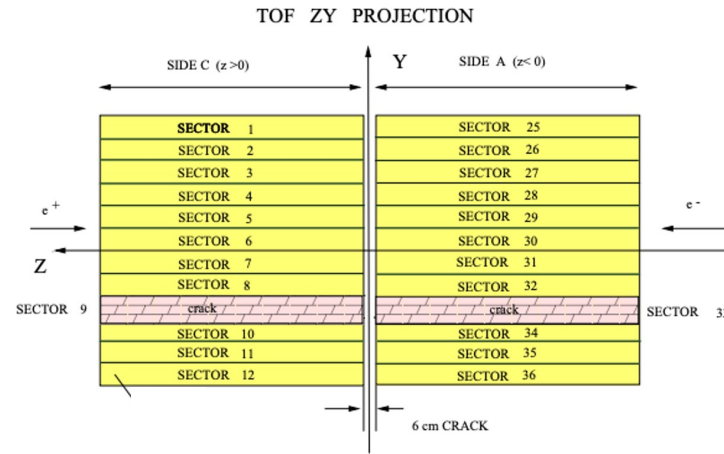


LIGHT GUIDE

EXTERNAL PHOTOMULTIPLIER

SCINTILLATOR

INTERNAL PHOTOMULTIPLIER



### Forward Electromagnetic Calorimeter (EMF)

4532 lead glass blocks on each side.  
 Cherenkov signal read out by phototriodes.

"Calimetría electromagnética en la zona "forward" de DELPHI y determinación de  $\sin^2\theta_w$  mediante la medida de la polarización del tau en el canal  $\rho^0$ "

**Autores:** [Jesús Marco de Lucas](#)  
**Tribunal Calificador de la Tesis:** [Antonio Ferrer Soria](#) (presid.),

### A method for calibration and test of the time-of-flight detectors (tof) for delphi

J.M. Benlloch (Valencia U.), M.V. Castillo (Valencia U.), A. Ferrer (Valencia U.), J. Fuster (Valencia U.), E. Higon (Valencia U.) et al. (Dec, 1989)

Published in: *Nucl.Instrum.Meth.A* 292 (1990) 319-328

### Physical properties of the TOF (Time of Flight) scintillation counters of DELPHI

J.M. Benlloch, M.V. Castillo, J. Cuevas, A. Ferrer, J. Fuster et al. (Nov 28, 1989)

### Physical properties of the time-of-flight scintillation counters of delphi

J.M. Benlloch (Valencia U.), M.V. Castillo (Valencia U.), A. Ferrer (Valencia U.), J. Fuster (Valencia U.), E. Higon (Valencia U.) et al. (Nov, 1989)

Published in: *Nucl.Instrum.Meth.A* 290 (1990) 327

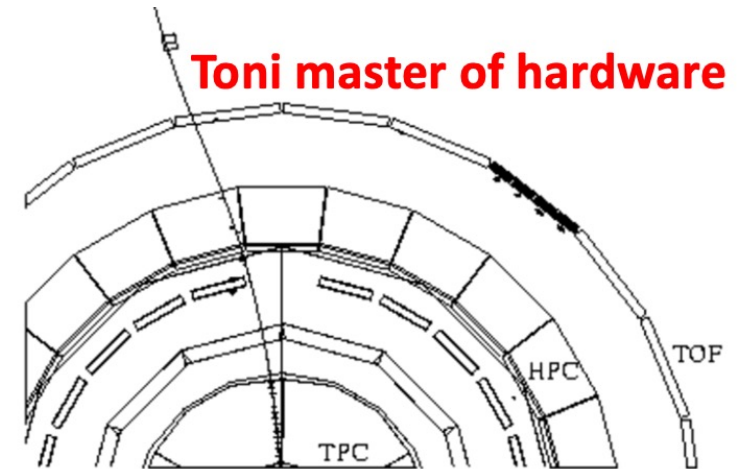
### TOF contribution to DELPHI hermeticity

R. Alemany and S. Cabrera

IFIC, Avda. Dr. Moliner 50, E-46100 Burjassot-Valencia (Spain)

Hermeticity

Trigger !



### Particle ID for tau-cF via TOF

### Toni's vista

A. Ferrer (Valencia U.), M.A. Garcia (Valencia U.), N. Horwitz (Valencia U.), E. Sanchis (Valencia U.) (1993)

Contribution to: 3rd Workshop on the Tau-Charm Factory, 643-655

effective light attenuation length : 135 cm,  
effective light speed : 15.91 cm/ns,  
time resolution : 1.2 ns, mip efficiency : 99.9%.

### Performance of the Forward Electromagnetic Calorimeter (FEMC) for the end caps of the DELPHI detector

A. Ferrer, J. J. Gomez, A. Sebastia and J. Velasco.  
IFIC, Centro Mixto Universidad, CSIC Burjasot, Valencia, Spain

A. Lopez, J. Marco, A. Ruiz.

Departamento de Fisica Fundamental, Universidad Santander, Spain

etc....

### Besides hardware, a lot of physics in Valencia

### $m_b$ at $m_H$ : the running bottom quark mass and the Higgs boson

[Javier Aparisi](#), [Juan Fuster](#), [André Hoang](#), [Adrián Irlés](#), [Christopher Lepenik](#), [Germán Rodrigo](#), [Michael Spira](#), [Seidai Tairafune](#), [Marcel Vos](#), [Hitoshi Yamamoto](#), [Ryo Yonamine](#)

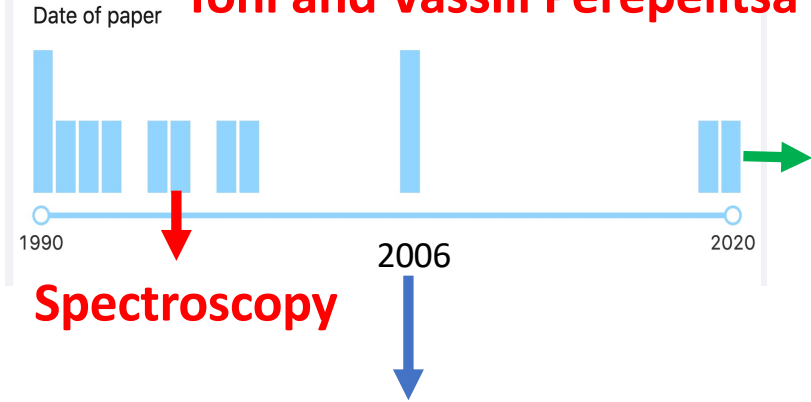
### Determination of the Top Quark Mass through the Measurement of the $\frac{\Gamma(Z \rightarrow b\bar{b})}{\Gamma_{hadr} - \Gamma(Z \rightarrow b\bar{b})}$ Ratio at High Luminosity LEP.

J.M. Benlloch<sup>1)</sup>, E. Cortina<sup>1)</sup>, A.M. Llopis<sup>1)</sup>, J. Salt<sup>1)</sup>, C. De la Vaissière<sup>2)</sup>

#### Abstract

We introduce the ratio of  $b\bar{b}$  events to the hadronic non  $b\bar{b}$  ones as an excellent quantity to determine indirectly the top quark mass at high luminosity LEP. Assuming a realistic impact parameter resolution we conclude that with a few million  $Z$ 's the top quark mass can be fixed with a precision of about 15 GeV.

# Toni and Vassili Perepelitsa

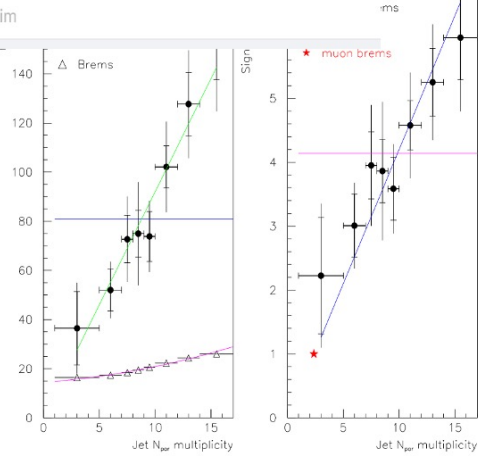


## Soft photon production

Observation of the inner muon bremsstrahlung in dimuon events at LEP1

A. Ferrer, V.F. Perepelitsa (Jul 12, 2006)

pdf links cite claim



Study of dependence of anomalous soft photon production on characteristics of parent jets in hadronic decays of Z

A.Ferrer, V.F. Perepelitsa  
Valencia University/ITEP

**Toni l'enthousiaste**

## Tachyons ?

**A search for anomalous Cherenkov rings**  
 V.F. Perepelitsa (Valencia U., IFIC), T. Ekelof (Valencia U., IFIC), A. Ferrer (Valencia U., IFIC), B.R. French (Valencia U., IFIC) (Dec 26, 2019)  
 e-Print: 1912.11839 [hep-ex]

**Physical interpretation of the anomalous Cherenkov rings observed with the DELPHI detector**  
 V.F. Perepelitsa (Valencia U., IFIC), T. Ekelof (Valencia U., IFIC), A. Ferrer (Valencia U., IFIC), B.R. French (Valencia U., IFIC) (Jan 22, 2020)  
 e-Print: 2001.08576 [hep-ex]

unpublished

**“adaptive” phenomenology...  
 Tachyons behave as electrons  
 After some Xrad e behave badly  
 Unusual exploitation of RICH  
 Look for arcs from liquid, gas plus  
 3 quartz radiators  
 Standard comparison data/MC  
 Impossible since performing a full  
 MC is out of question.  
 Not the right detector !**

**Peut-être que tu n'es pas très convaincu, mais je t'assure que cela m'intrigue beaucoup. Nous ne pouvons prouver que cela est dû au background. Malheureusement dans les deux cas il s'agit de résultats qui ne sont pas très faciles à présenter d'une manière très convaincante. Mais c'est tout ce que nous avons trouvé.**

**Et Toni, l'ami**

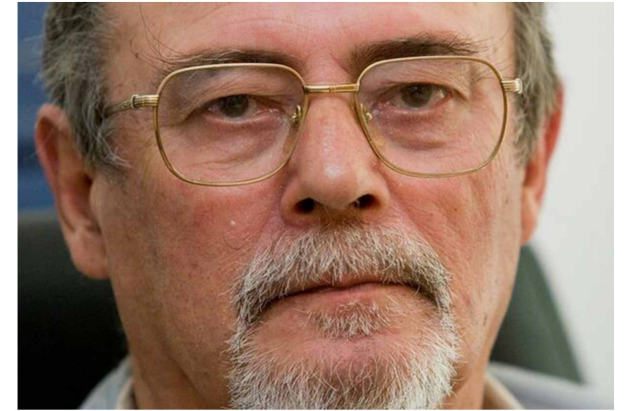


**Our last encounter  
between mutual friends**

Jose Mariano GAGO



Gaspar BARREIRA



P.Sonderegger

