



**The H.R.S. Years**

*Neville*

ft. P.Kooijman

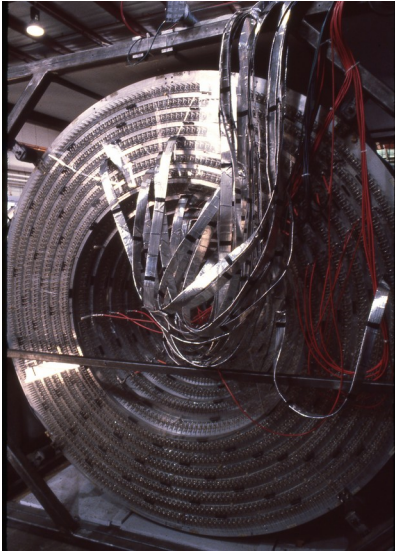
# Early times

- PEP was to start up in 1979
- Picture taken a week after official start date.
- Intersection 6 was last in construction
- In the background the horse track

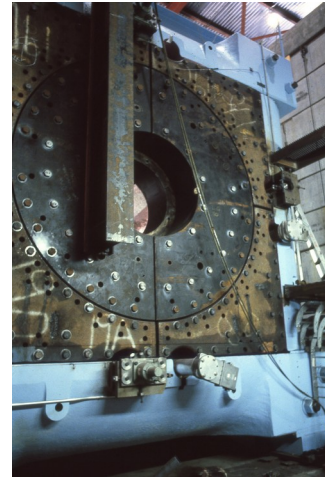


# Start building

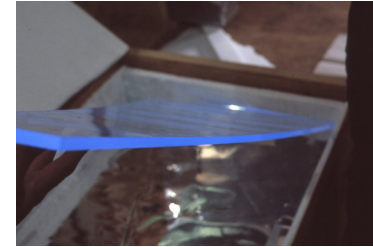
Drift chamber (UM) arrives  
Together with a shy PostDoc  
called Neville



The magnet, Iron yoke  
and cryogenics  
from Argonne  
(the old 12ft bubble chamber)



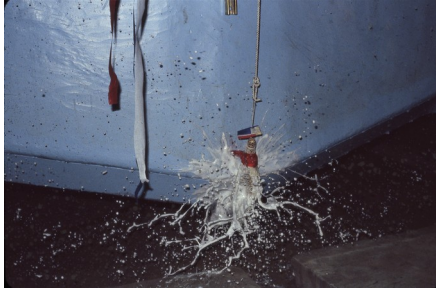
And scintillator and  
lightpipes for the  
Calorimeter  
from Indiana and Purdue



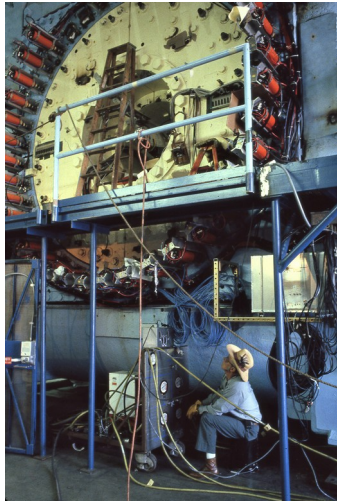


# After waiting for quarks to be searched for

## The Launch



Roll into the beam



Most of the collaboration  
except the shy U-M Poast-Doc

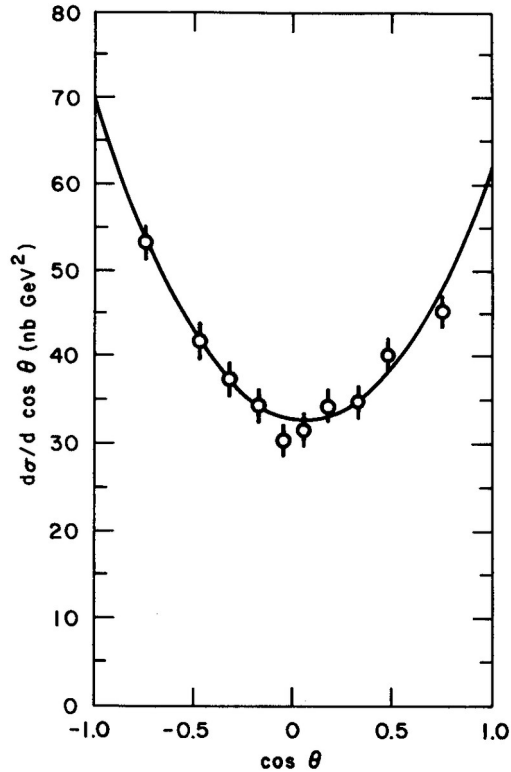
# Data taking starts

- Starting after PETRA – PEP set at 29 GeV and stayed there
- We studied
  - Muon asymmetry (very exciting if you don't know  $M_Z$ )
  - Fragmentation (Especially Charm – Nobody new anything about that)
  - $\tau$ -decay (There was 5% missing in the BR's)
  - Exotic particles (as at every accelerator before and after PEP)
  - Detector upgrades (as with every detector before and after HRS)

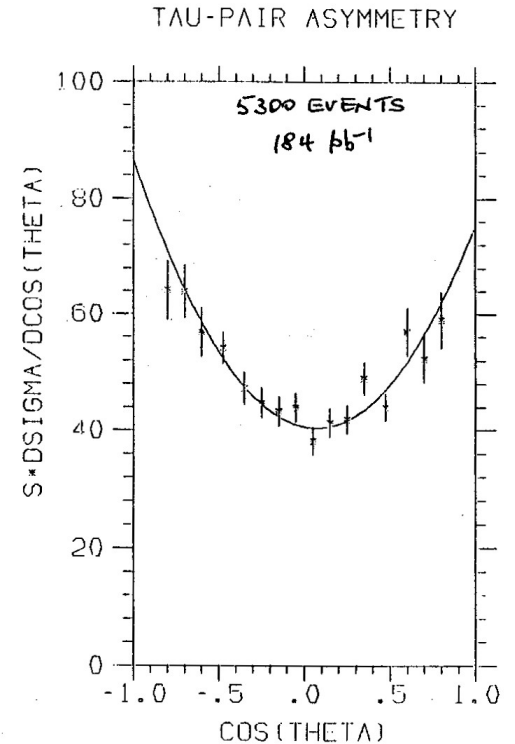
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  - Detector upgrades (as with every detector before and after HRS)
- We produced children

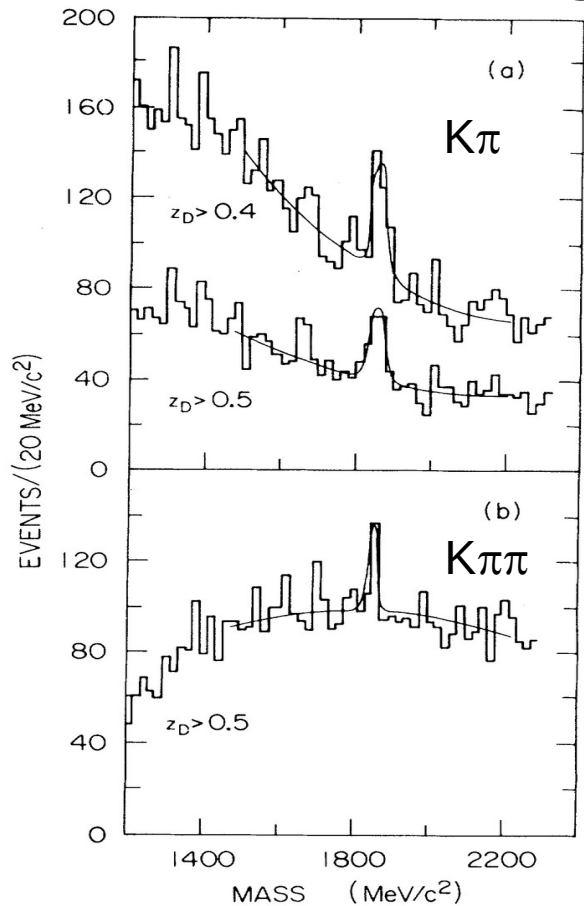
# Some examples (of the physics)



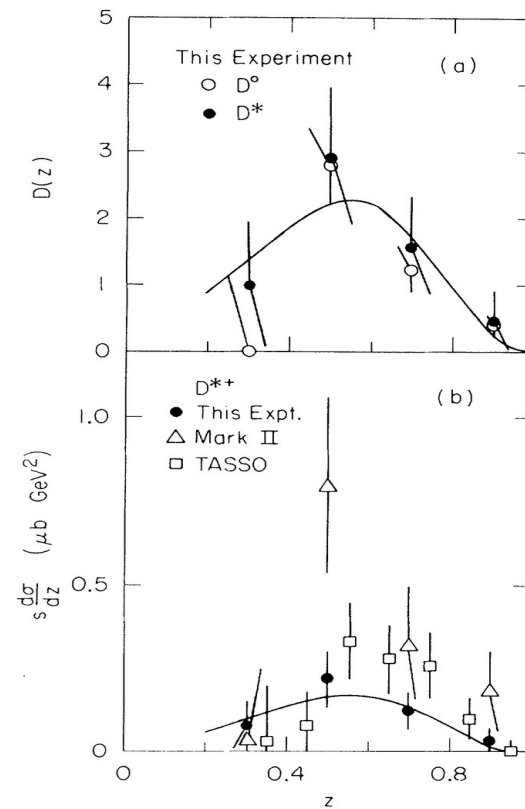
The muon and tau asymmetry was consistent with an  $M_Z = 93 \text{ GeV}$



# Physics (continued)

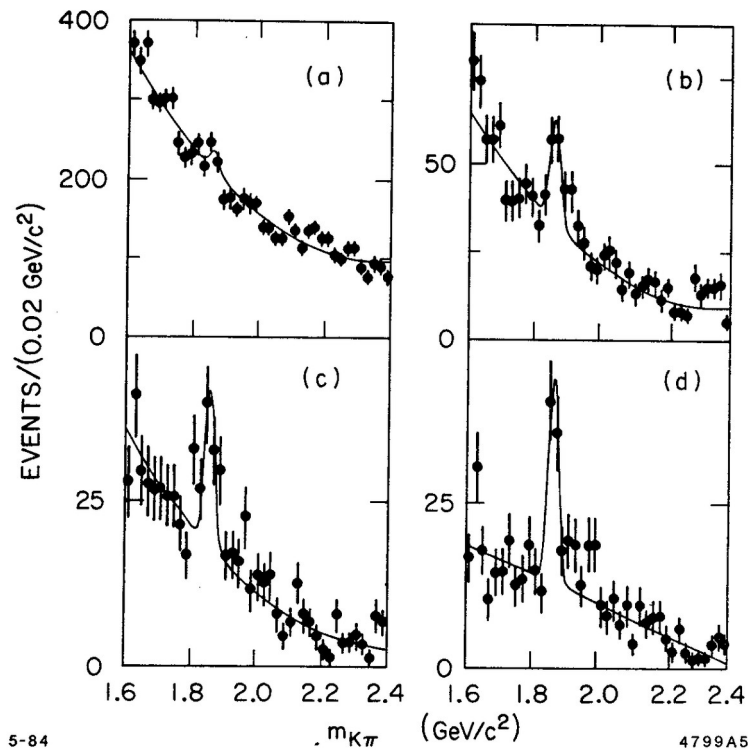
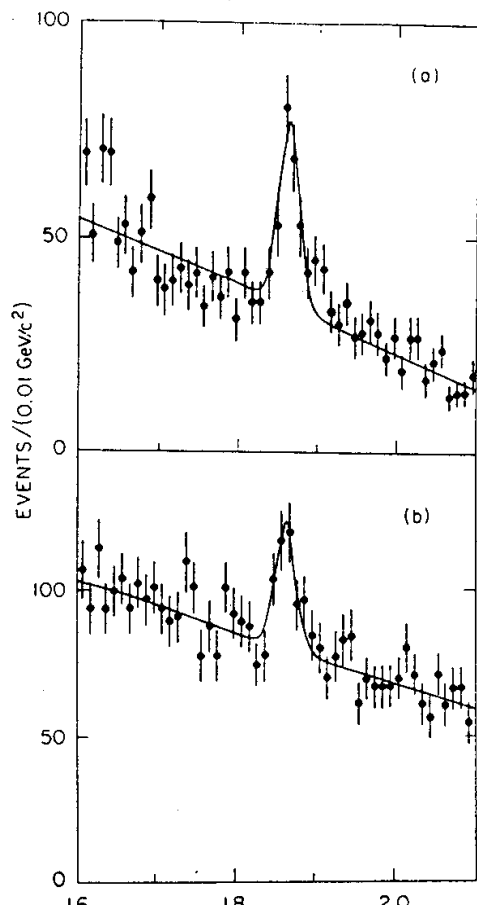


Only experiment at the time with good enough resolution to see the D without the mass difference trick



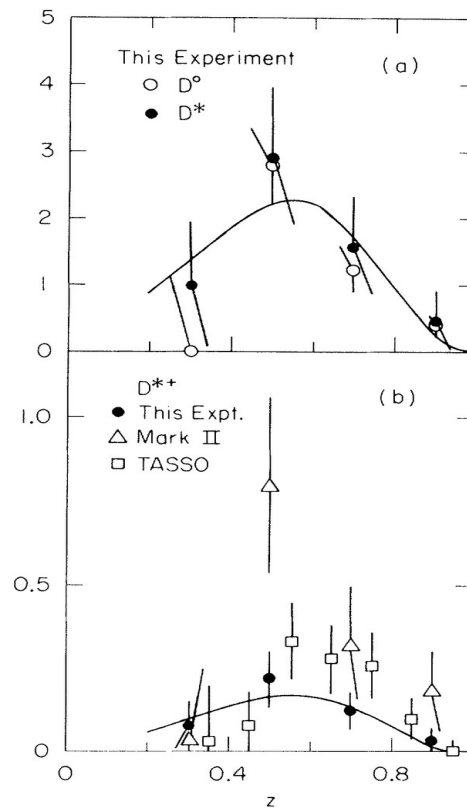


# Physics (continued)



5-84

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M. Derrick, E. Fernandez<sup>1</sup>, R. Fries<sup>2</sup>, L. Hyman<sup>3</sup>, P. Kooijman,  
 J.S. Loos, B. Musgrave, L.E. Price, J. Schlereth,  
 K. Sugano, J.M. Weiss, and D.E. Wood  
 Argonne National Laboratory, Argonne, IL 60439

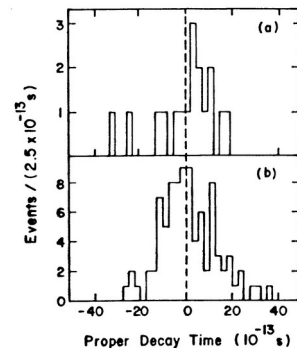
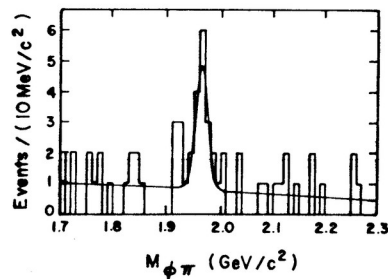
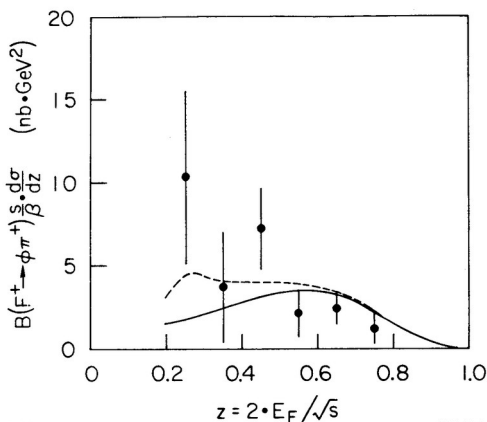
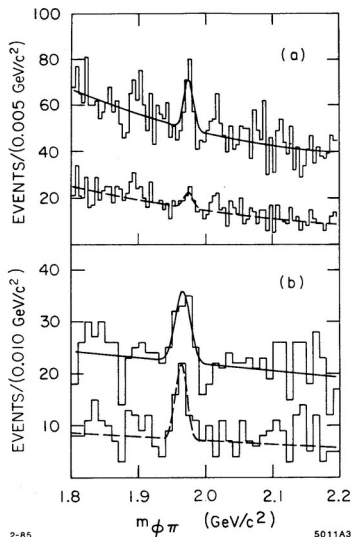
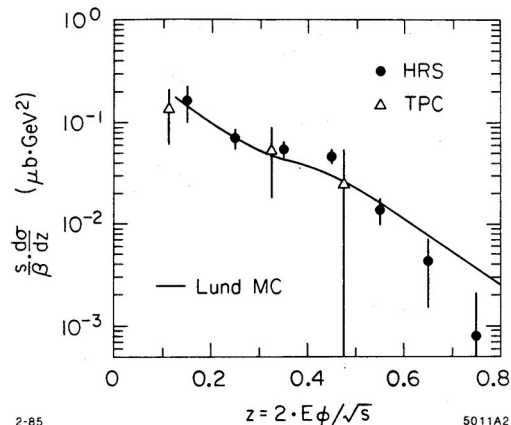
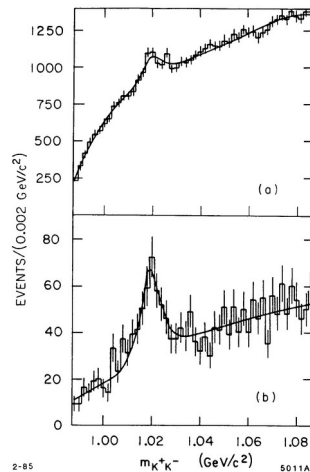
G. Baranko<sup>4</sup>, P. Baringer, D. Blockus, B. Brabson, G.E. Forden<sup>5</sup>,  
 S.W. Gray<sup>6</sup>, C. Jung, H. Neal, H. Ogren,  
 D.R. Rust, and M. Valdata-Nappi<sup>7</sup>  
 Indiana University, Bloomington, IN 47405

C. Akerlof, G. Bonvicini, J. Chapman, D. Errede, N. Harnew<sup>8</sup>,  
 P. Kesten, S. Kooijman, D.I. Meyer, D. Nitz, D. Rubin<sup>6</sup>,  
 A.A. Seidl<sup>9</sup>, R. Thun, T. Trinko<sup>9</sup>, and M. Willutzky  
 University of Michigan, Ann Arbor, MI 48109

I. Beltrami, B.G. Bylsma, R. DeBonte, D. Koltick, K.K. Gan,  
 F.J. Loeffler, E.H. Low, U. Mallik<sup>11</sup>, R.L. McIlwain, D.H. Miller,  
 C.R. Ng, P.P. Ong<sup>10</sup>, L.K. Rangan, E.I. Shibata, and R.J. Wilson<sup>11</sup>  
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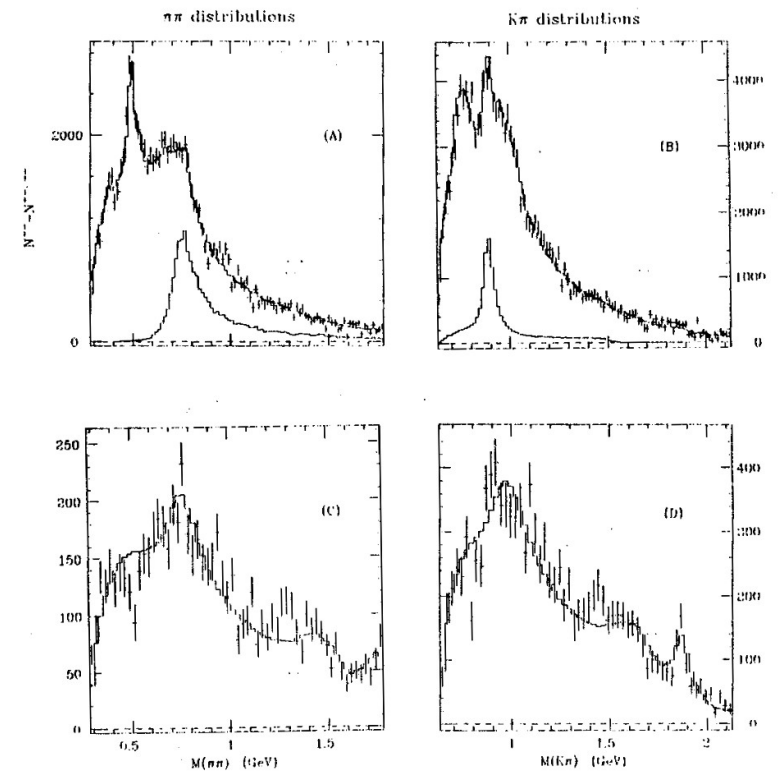
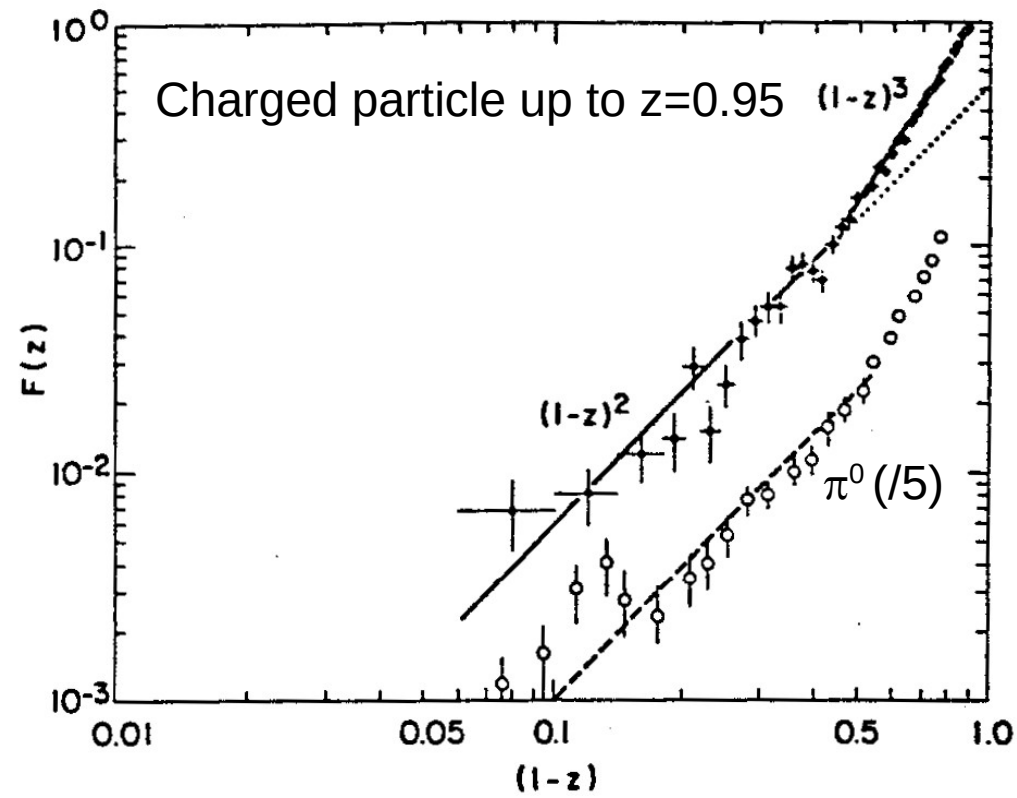
B. Cork  
 Lawrence Berkeley Laboratory, Berkeley, CA 94720

L. Keller and J. Va'vra  
 Stanford Linear Accelerator Center, Stanford, CA 94305



$$\tau_F = 3.5^{+2.4}_{-1.8} \pm 0.9$$

# Fragmentation other than charm



# Our event display with the only “Mono-jet” event

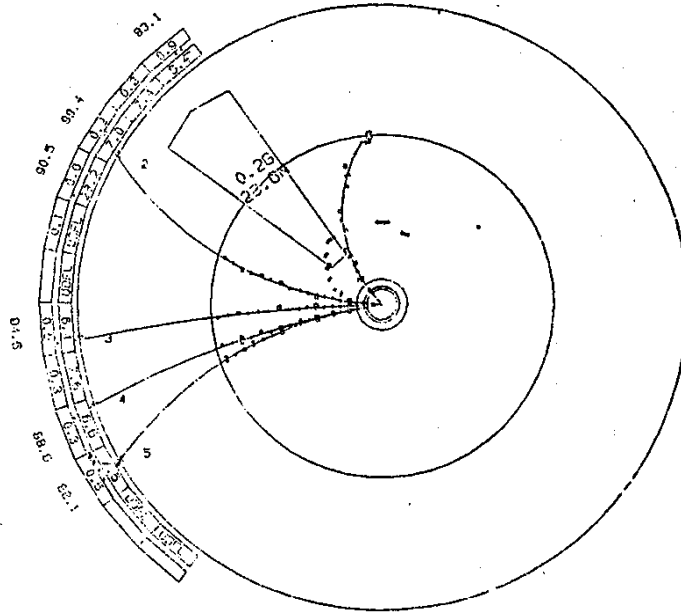


Fig. 31

H R S RUN=6106

EVENT= 8692

DCHITS = 138

NPRNG = 6

SH SUM= 3.1 + 0.2

TRACK MOMENTUM THETA

2 1.0 85.9

3 -5.0 94.9

4 -2.8 87.9

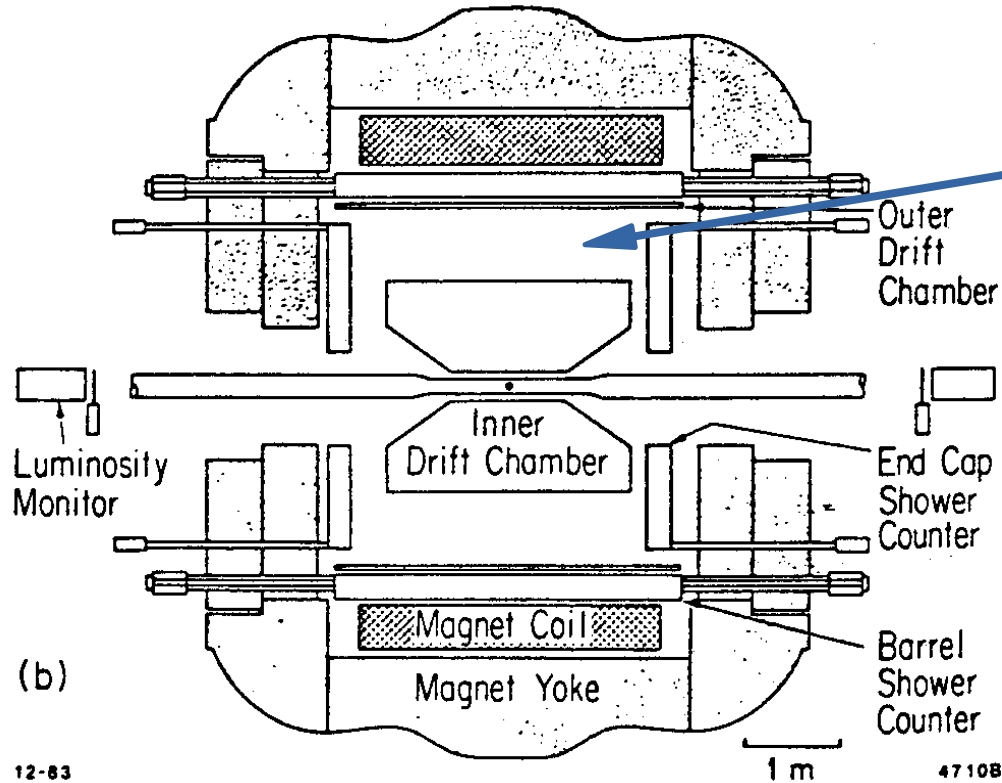
5 -1.1 89.3

6 0.5 59.0

TRIG.= F2 F3 S6 A2 D1 D2

Our limit killed Glashow's explanation of UA1 monojets

# Upgrades



This gap was tempting  
Suggestions were:

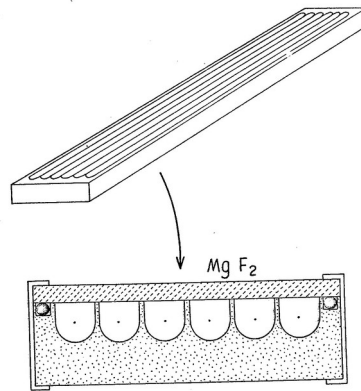
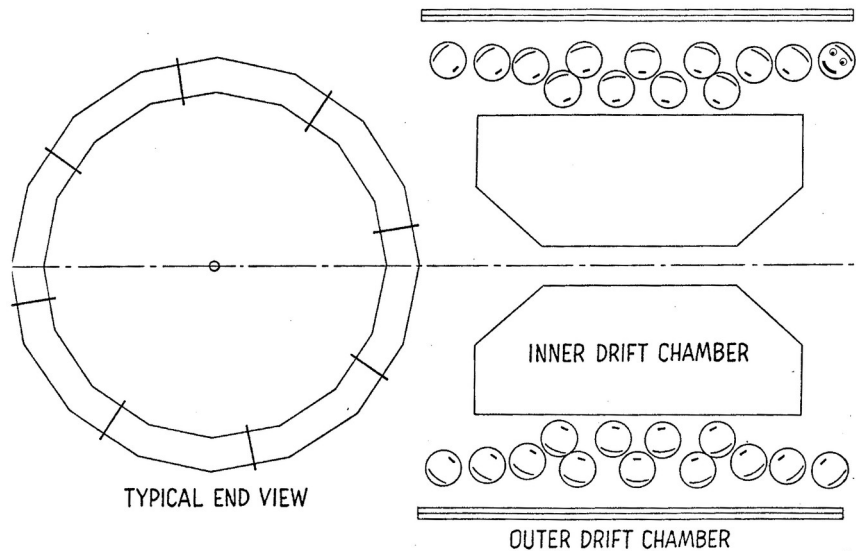
- A TPC
- An Ionisation chamber (ISIS)
- Extra driftchamber
- Photon converter

And the winner

- A Cherenkov counter



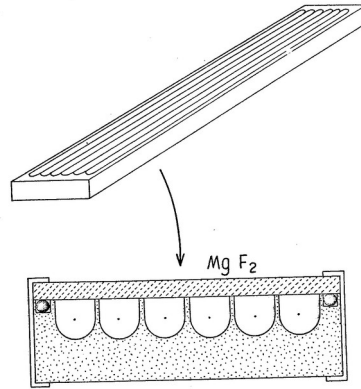
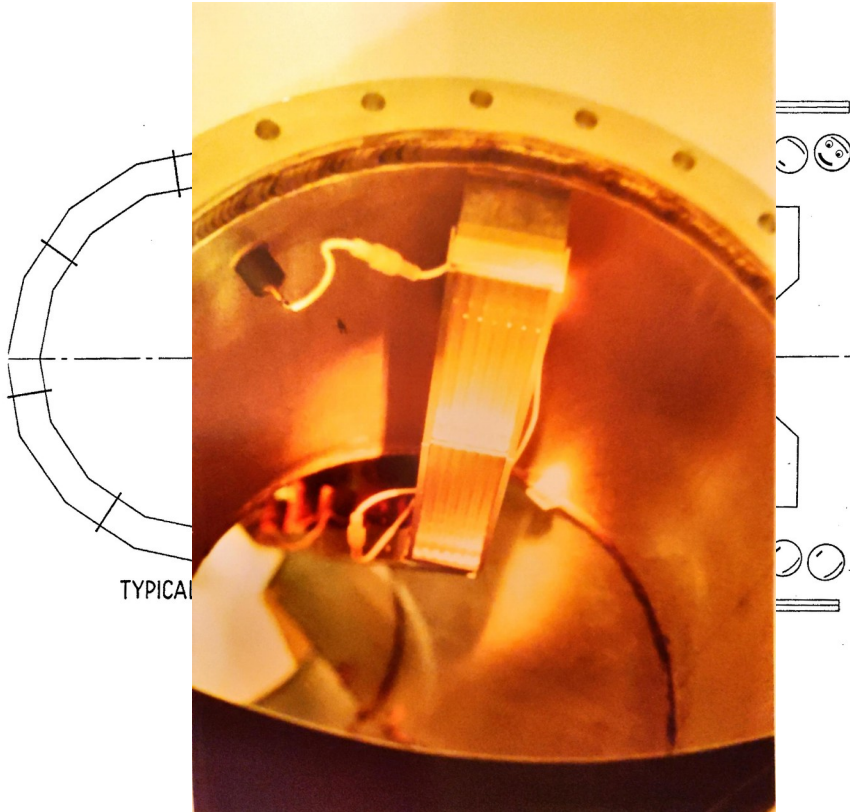
# Design made



- 16 atm Ar/N<sub>2</sub> mixture 90/10
- Photoionization proportional chamber
- Ar/CO<sub>2</sub>/C<sub>6</sub>H<sub>6</sub> 79/20/1

As far as I know the first Cherenkov with such a readout in an experiment

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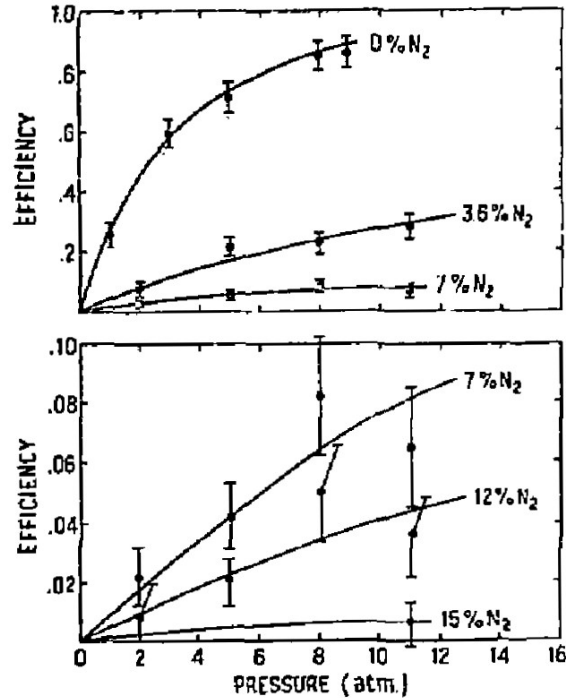


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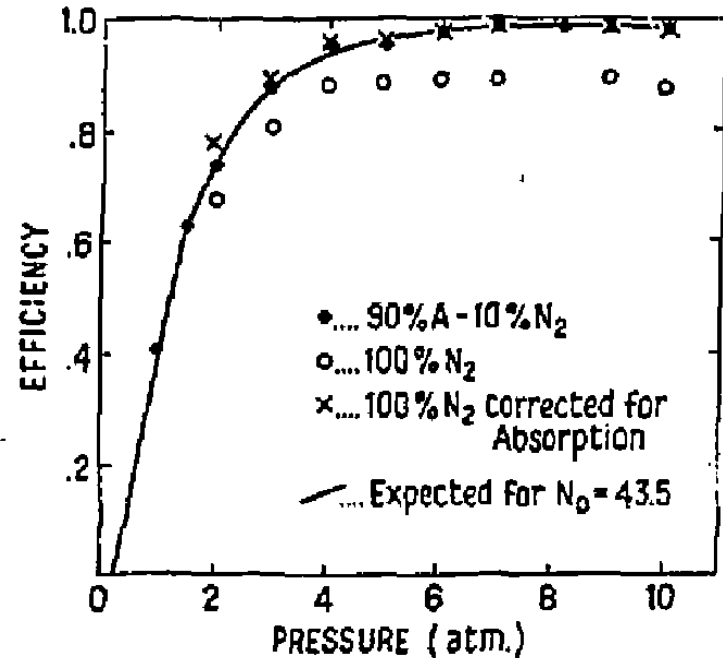
As far as I know the first Cherenkov with such a readout in an experiment

# Tests were done

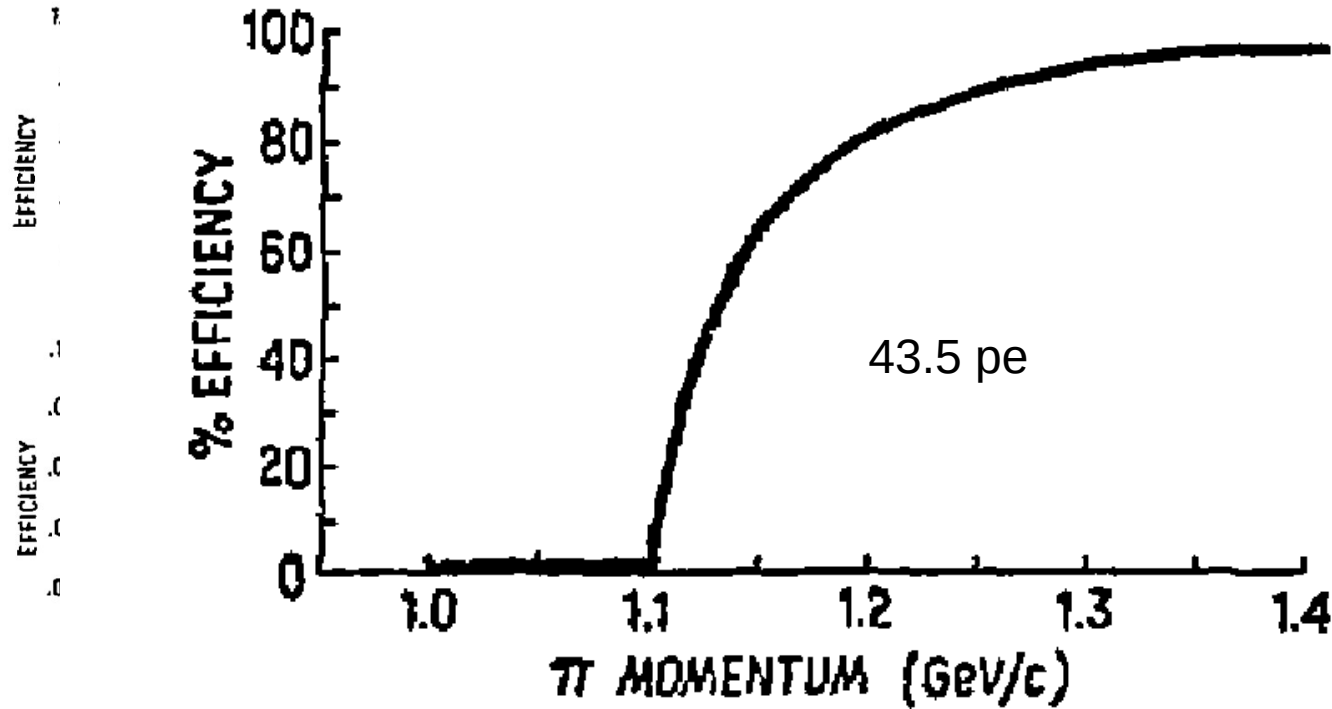
Suppression of scintillation of Argon with Nitrogen



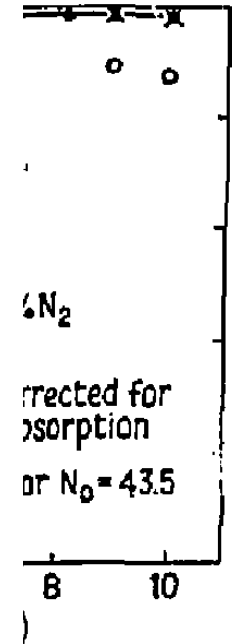
Efficiency of radiator gasses in 10 GeV negative pion beam



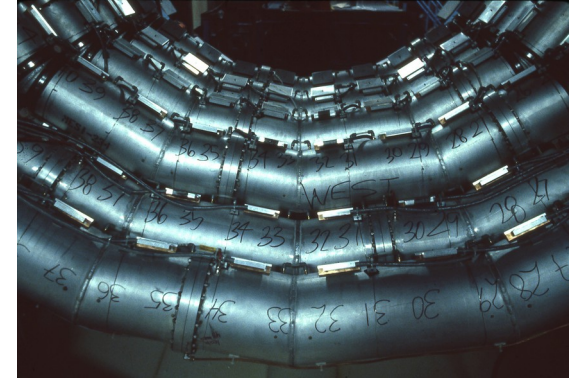
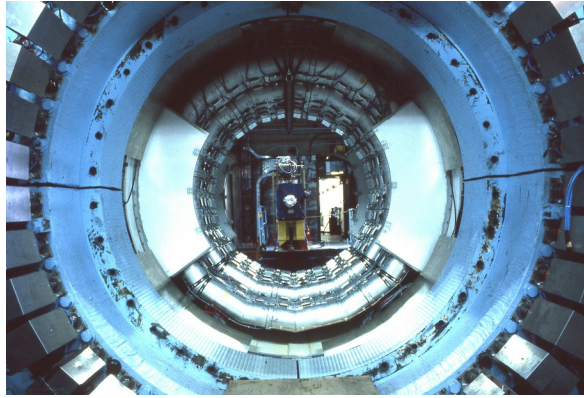
# Tests were done



or gasses  
pion

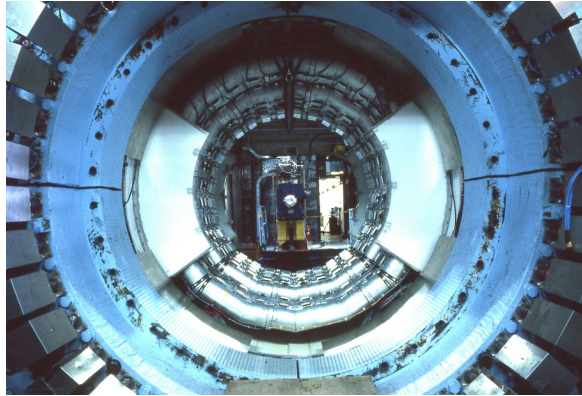


# It was built and installed

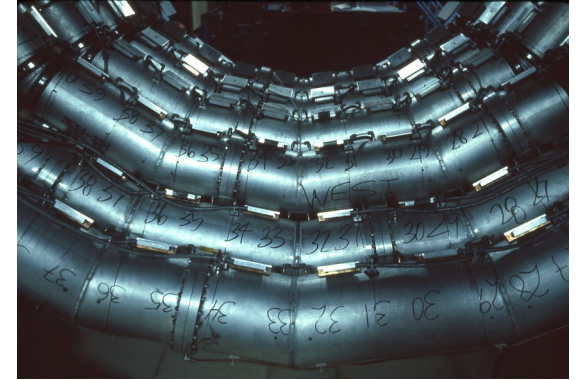




# It was built and installed



Unfortunately it didn't quite get the advertised efficiency.....



And Neville went to a new job in Europe. I'm sure he would have got it working correctly.

Also we suffered from a luminosity upgrade so only 1/3 of our data had Cherenkov data

# Some things made our life difficult



- Swallows are nice if they don't nest above your IR entrance
- Rattle snakes aren't nice when they visit you on nightshift
- Black widows had to be removed before you opened area under floor where the cables lay
- Horseflies (and smells) from the racetrack weren't pleasant
- Sometimes people on the interstate tried to burn you down
- And mice sometimes ran up trouserlegs



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Went to the 4<sup>th</sup> div

# Some other things made our lives very pleasant



Hope you enjoyed the memories



Hope you enjoyed the memories



Have a good retirement