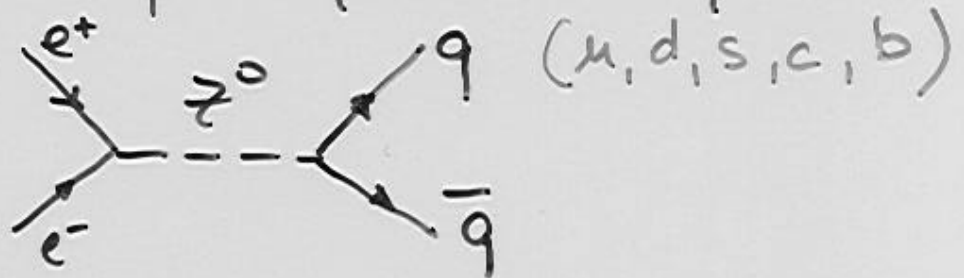


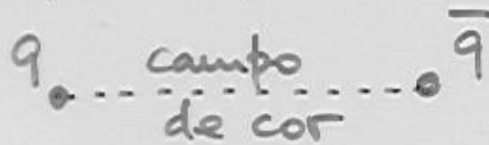
# CANAIS DE DESINTEGRAÇÃO DO $Z^0$

## CANAL HADRÔNICO:

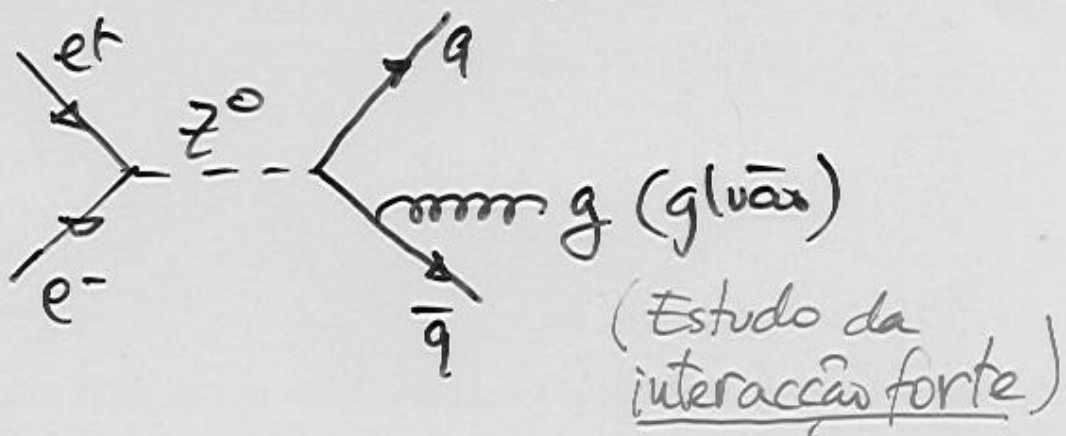
Produção de par quark-antiquark:



fragmentação (produção de jets)



Acontecimentos a três jets:

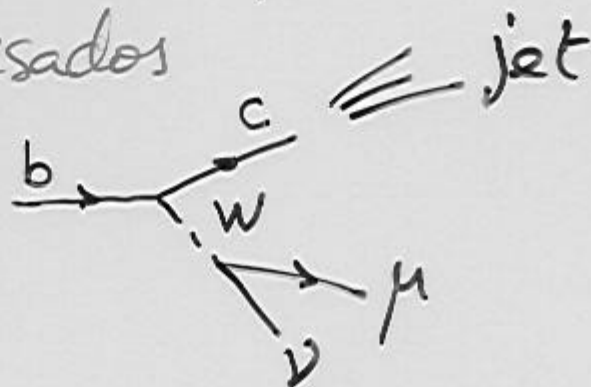


## Características dos eventos hadrônicos:

- número de traços carregados elevado ( $> 6$ )
- estrutura (topologia) de jets
- energia no calorímetro hadrônico e no calorímetro e.m. ( $\pi^0 \rightarrow \gamma\gamma$ )

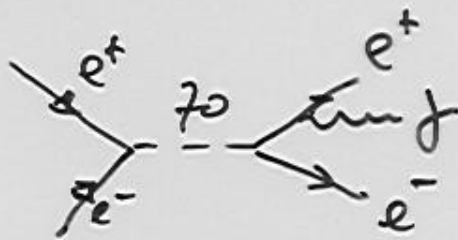
## Identificação dos quarks iniciais:

- problema difícil
- desintegração semi-leptônica dos quarks pesados



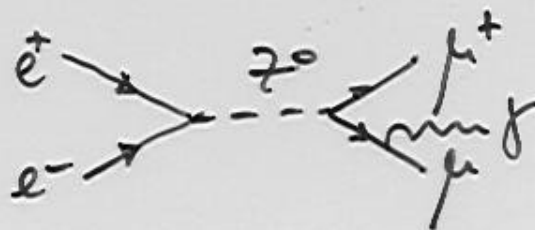
## CANAIS LEPTÓNICOS

$e^+e^-(\gamma)$



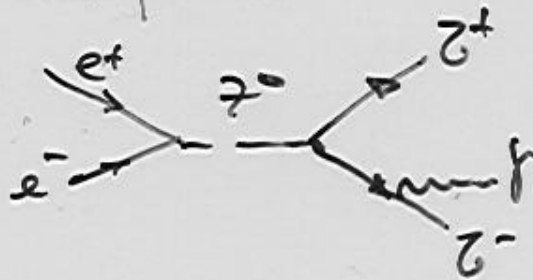
- interferência com canal  $t$
- electrão-positrão back-to-back
- possibilidade de radiação  $\gamma$ .  
(eventos acolineares)

$\mu^+\mu^-(\gamma)$



- $\mu^+\mu^-$  back-to-back
- background: múons cósmicos

$Z^+Z^-(\gamma)$



decaimento do  $Z$ :

$$Z \rightarrow l \bar{\nu}_l \nu_l \quad \text{leptónico}$$

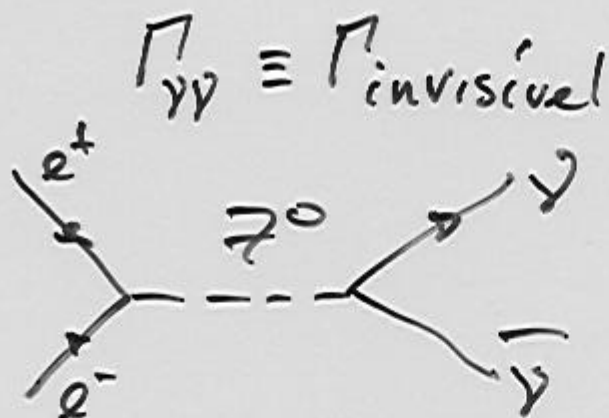
$$Z \rightarrow \pi \bar{\nu}_Z, K \bar{\nu}_Z, p \bar{\nu}_Z \quad \text{hadrónico}$$

$$\rightarrow 3\pi \pi^0 \nu$$

topologias: 1-1 ; 1-3 ; 3-3

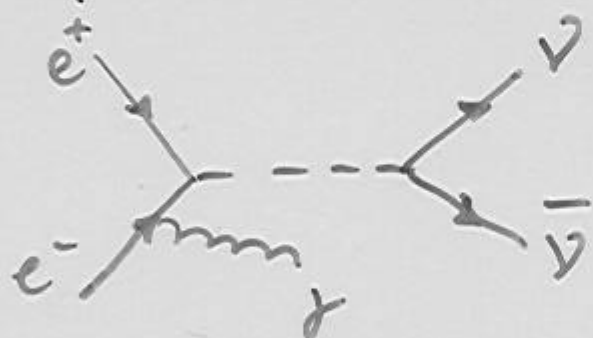
acolinearidade: neutrinos

# DESINTEGRAÇÃO EM NEUTRINOS



função de  $N_{\nu}$

Radiação no estado inicial :

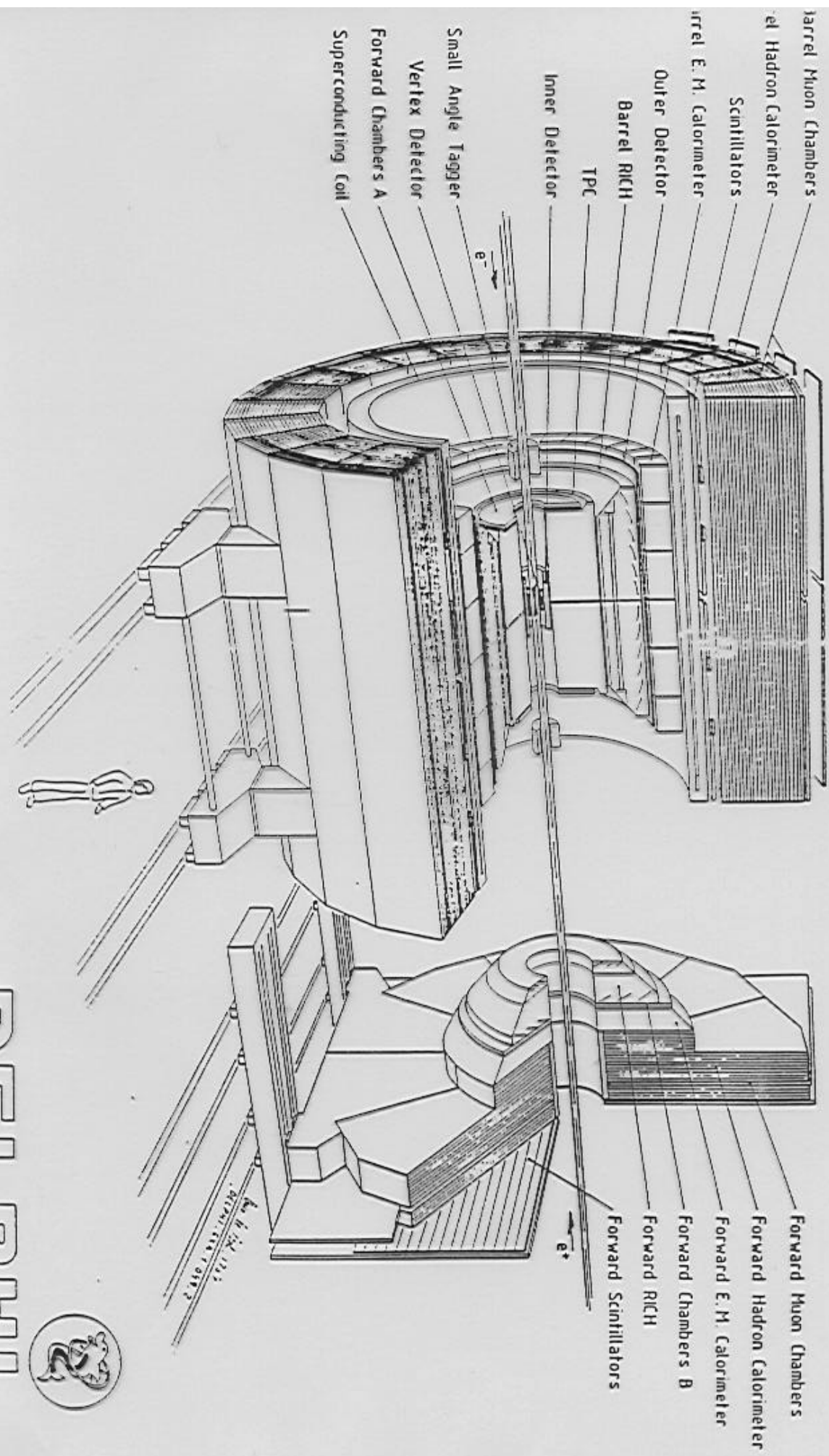


$\Rightarrow$  1 fóton no detector

Processo utilizado para medir  $N_{\nu}$ ,

$$a \quad \sqrt{s} = M_Z + \Delta E$$

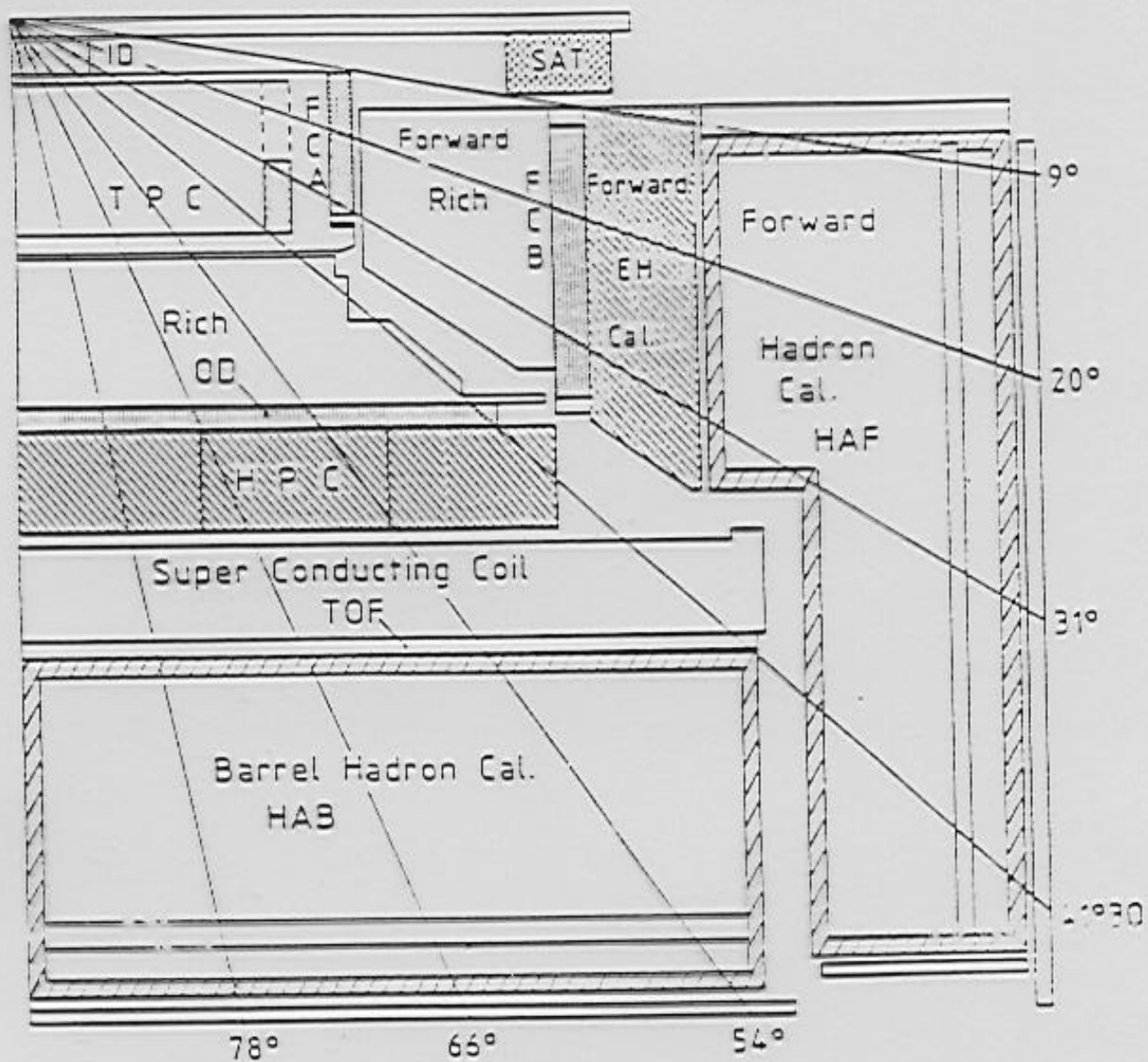
$$\Delta E = 5-10 \text{ GeV}$$


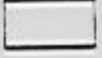





DELPHI



$e^+$   $e^-$



- |   |                      |   |             |
|---|----------------------|---|-------------|
|  | Track trigger        |  | TOF trigger |
|  | Electromagnetic cal. |  | Sat monitor |
|  | Hadronic cal.        |   |             |

# DELPHI Interactive Analysis

Beam: 45.6 GeV

Run: 15809

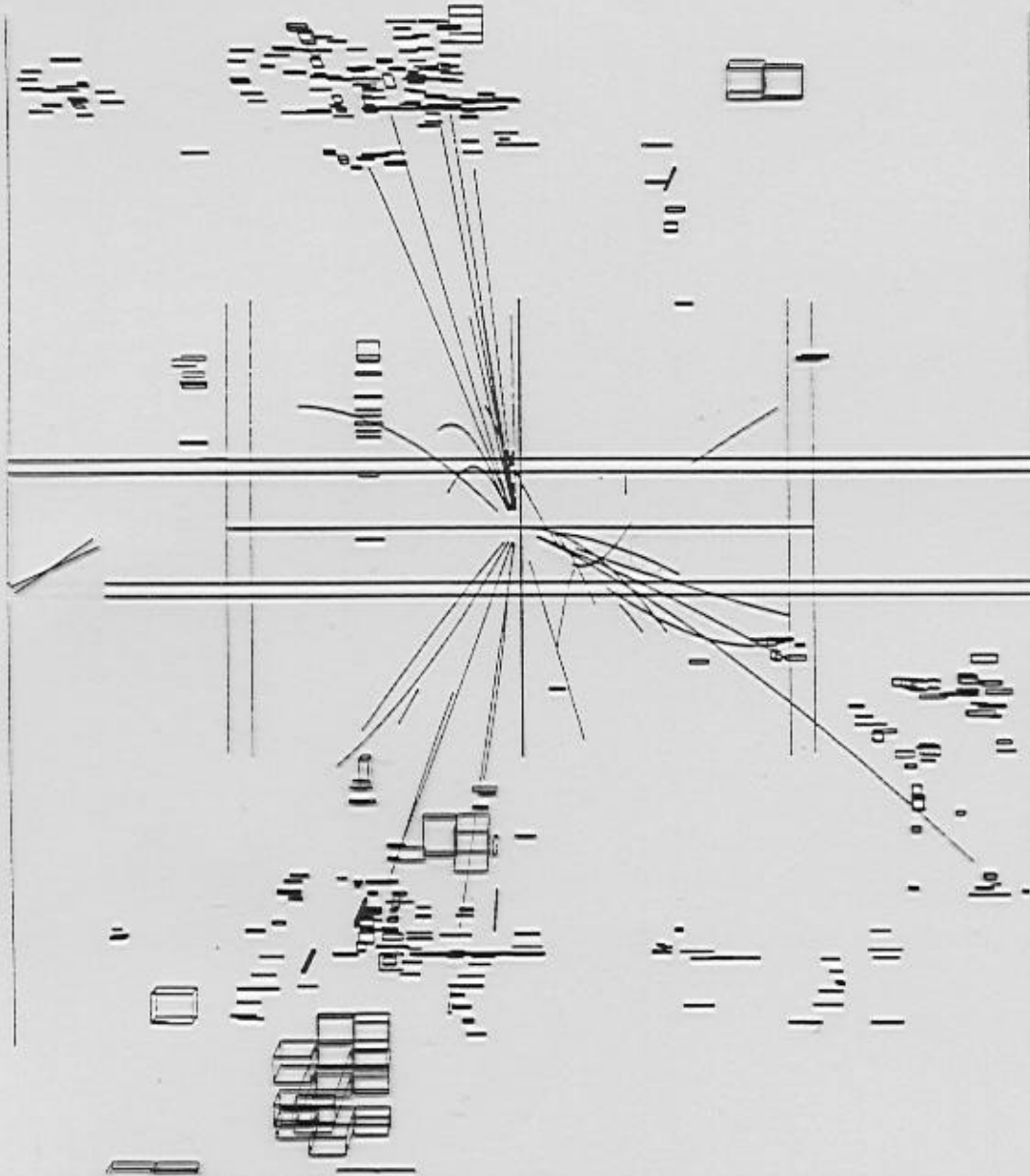
DAS : 29-Aug-1990

Proc: 2-Oct-1990

Evt: 530

Scan: 16-Oct-1990

	TD	TE	TS	TK	TV	ST	FA
Act	66	0	0	33	0	0	0
	(170)	( 0)	( 0)	( 53)	( 43)	( 0)	( 0)
Deact	0	0	0	0	0	0	0
	( 0)	( 0)	( 0)	( 52)	( 23)	( 0)	( 0)



X  
Y



# DELPHI Interactive Analysis

Beam: 45.6 GeV

Run: 15622

DAS : 26-Aug-1990

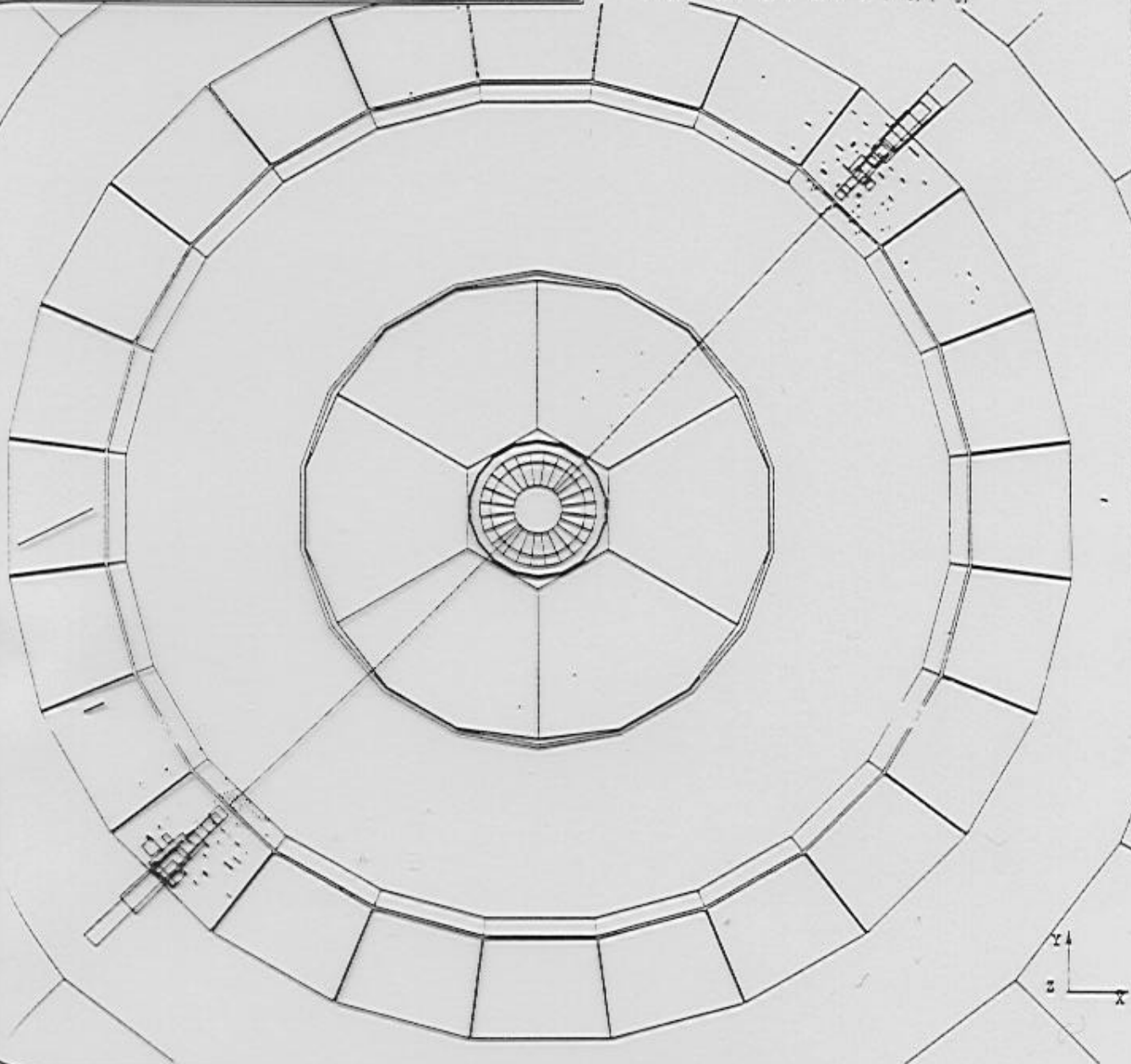
09:20:00

Proc: 3-Oct-1990

Evt: 1119

Scan: 16-Oct-1990

	TD	T2	T3	T4	T5	ST	TA
Acc	15	0	0	3	0	0	0
Deact	( 32)	( 0)	( 0)	( 5)	( 6)	( 0)	( 0)
	0	0	0	0	0	0	0
	( 0)	( 0)	( 0)	( 4)	( 3)	( 0)	( 0)





# MEDIDA DOS PARÂMETROS DA RESSONÂNCIA $Z^0$

(Experiência Delphi/LEP)

$$\sigma(s) = \sigma_0 \times B.W(M_Z, \Gamma_Z)$$

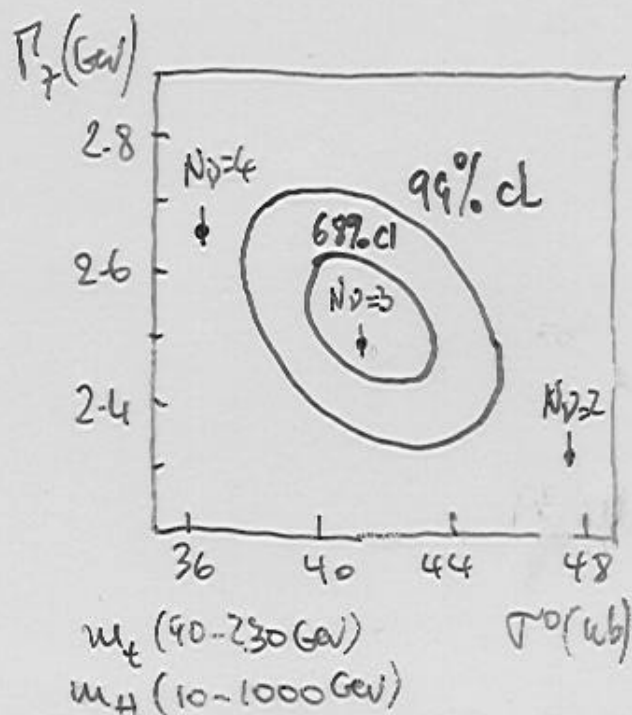
$$\sigma_0 = \frac{12\pi \Gamma_e \Gamma_h}{M_Z^2 \Gamma_Z^2}$$

Ajuste a acontecimentos hadrônicos!

$$M_Z = 91.171 \pm 0.030(\text{stat}) \pm 0.030(\text{beam}) \text{ GeV}$$

$$\Gamma_Z = 2.511 \pm 0.065 \text{ GeV}$$

$$\sigma_0 = 41.6 \pm 0.7 \pm 1.1 \text{ nb}$$



Número de espécies de neutrinos (leves)

$$\Gamma_7 = \underbrace{\Gamma_h + \Gamma_{ee} + \Gamma_{\mu\mu} + \Gamma_{\tau\tau}}_{\text{fixado ao Mod. Stand.}} + \underbrace{N_\nu \Gamma_{\nu\nu}}_{\Gamma_{inv}}$$

$$\Rightarrow \Gamma_{inv} = 495 \pm 20 \pm 39 \text{ MeV}$$

$$\Rightarrow N_\nu = 2.97 \pm 0.12 \pm 0.23$$

