520
615
6144

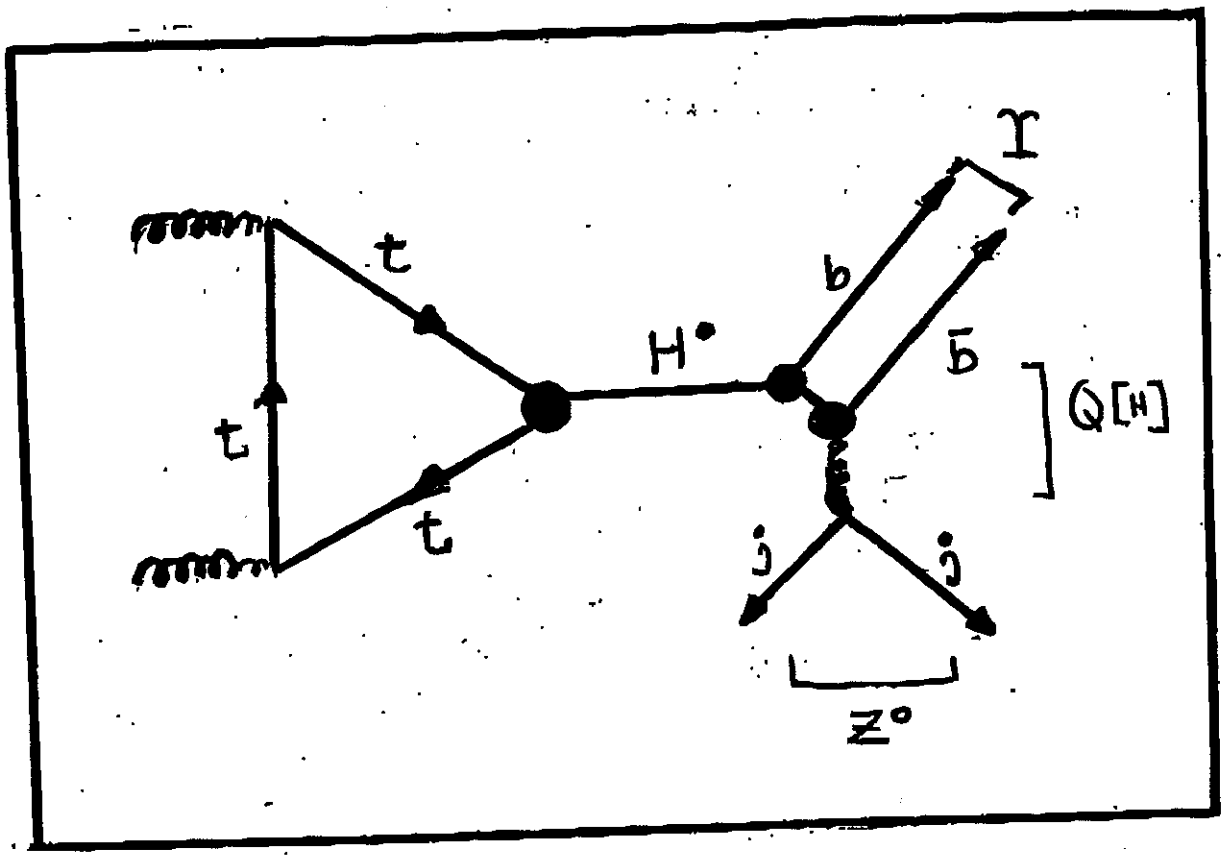
To: Prof. M.S. Gold

Repeat w/ 750 pb^{-1}
g $\mu^+\mu^-e^+e^-$

真

From K.W. LAI

$H^\circ \rightarrow \Upsilon + Z^\circ$



$$m[H] = m[\Upsilon] + m[Z^\circ] + \underline{Q[H]}$$

Why Use Q

- $H \rightarrow \Upsilon + Z^0$ (2 - Body Decay)

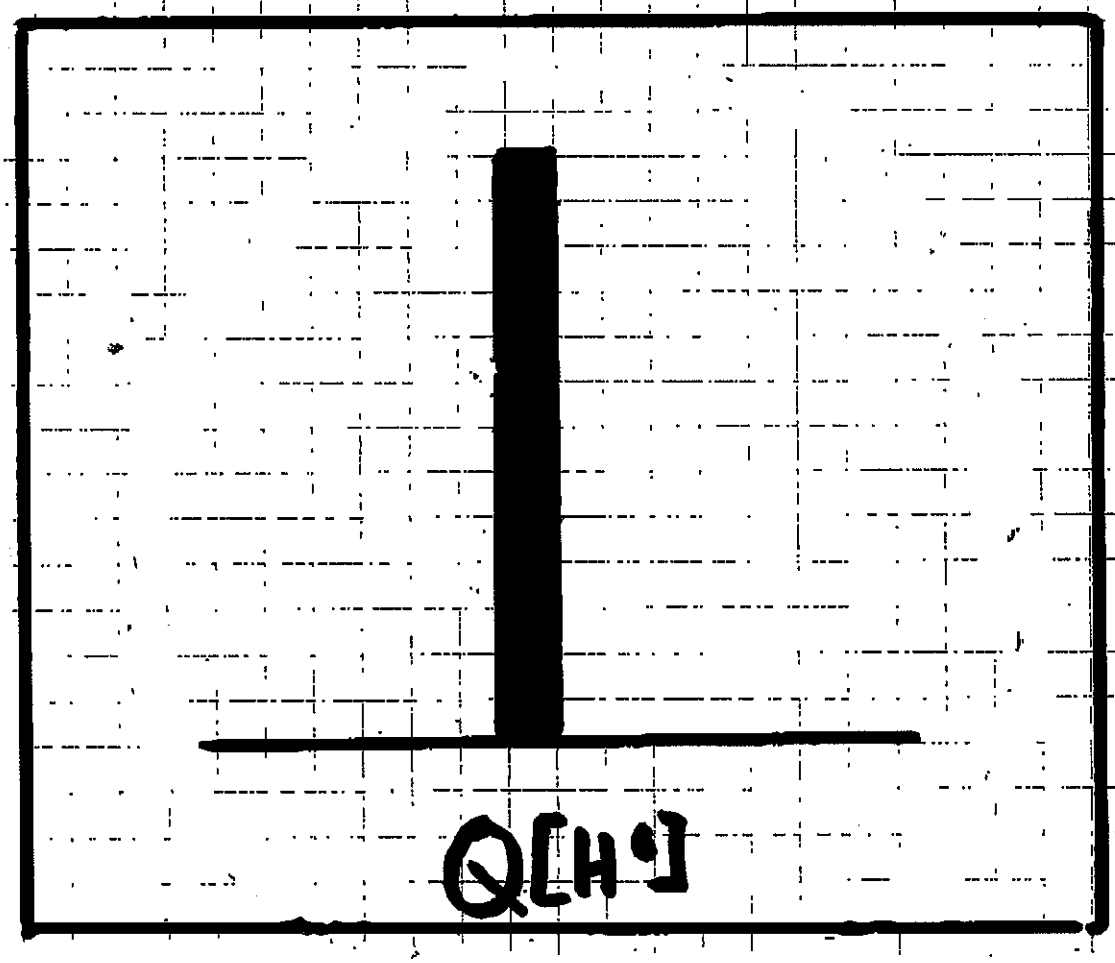
- $Q = m(\mu^+\mu^- + \mathring{\jmath}\mathring{\jmath}) - (m[\mu^+\mu^-] + m[\mathring{\jmath}\mathring{\jmath}])$

  Two Variables: $\left.\begin{array}{l} m(\mu^+\mu^-) \\ m(\mathring{\jmath}\mathring{\jmath}) \end{array}\right\} \longrightarrow$ One Variable (Q)

- Measurement error of Q is greatly reduced due to subtraction of two variables $m(\mu^+\mu^- + \mathring{\jmath}\mathring{\jmath})$ and $m(\mathring{\jmath}\mathring{\jmath})$ Because their measurement errors cancel each other out.

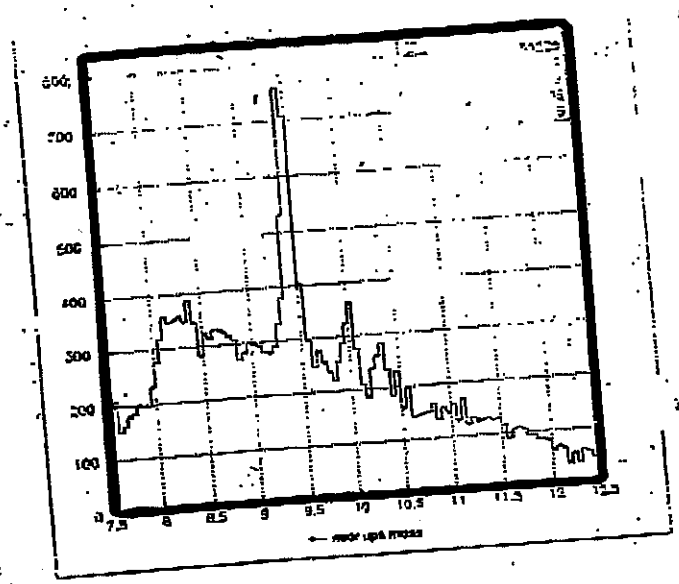
If $m[H^{\bullet}] \approx$

$m[Z^{\bullet}] + m[\mathcal{X}]$

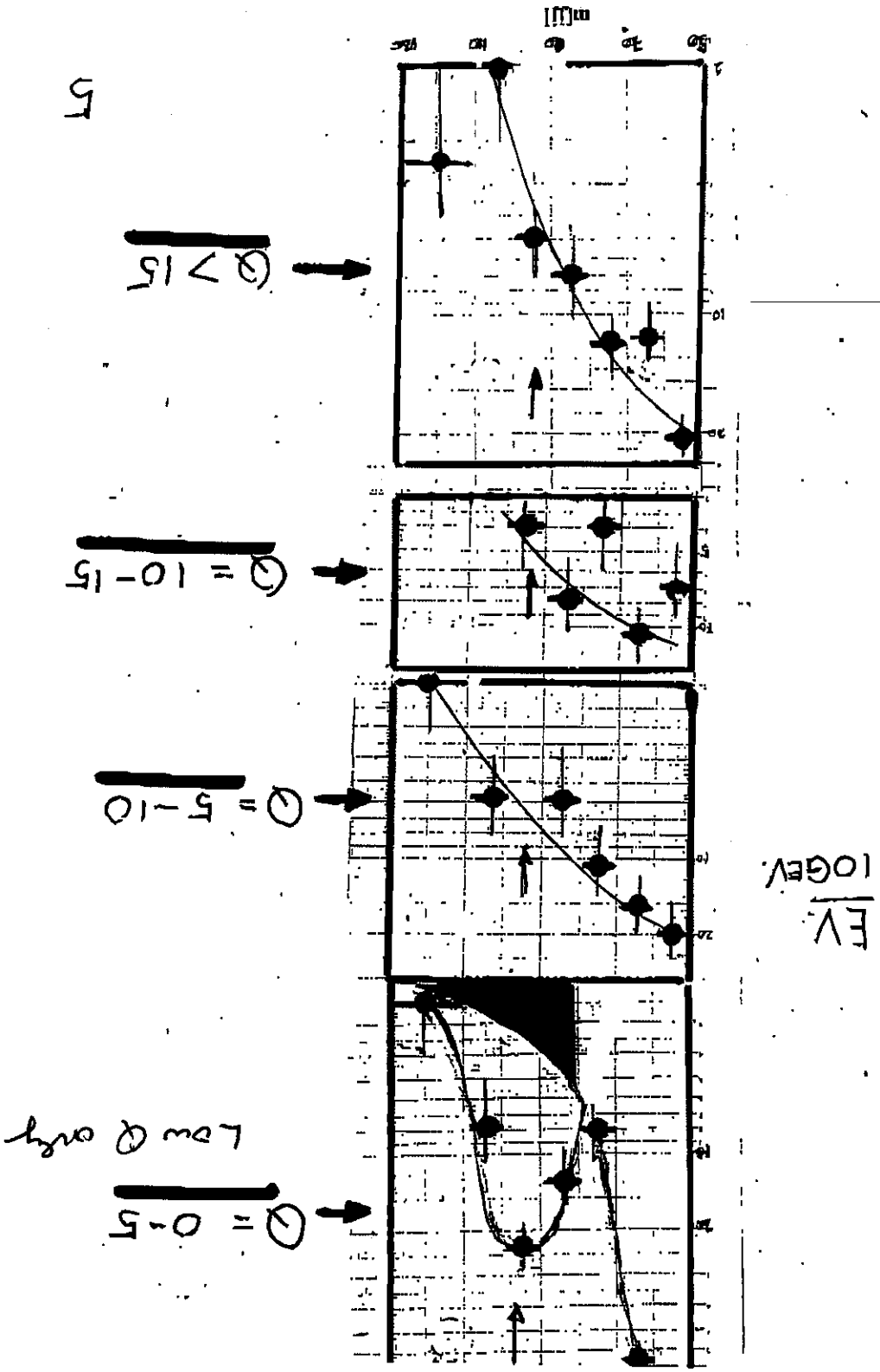


Run (II) ~[300 pb^{-1}]

$[\Upsilon \to \mu^+\mu^-]$



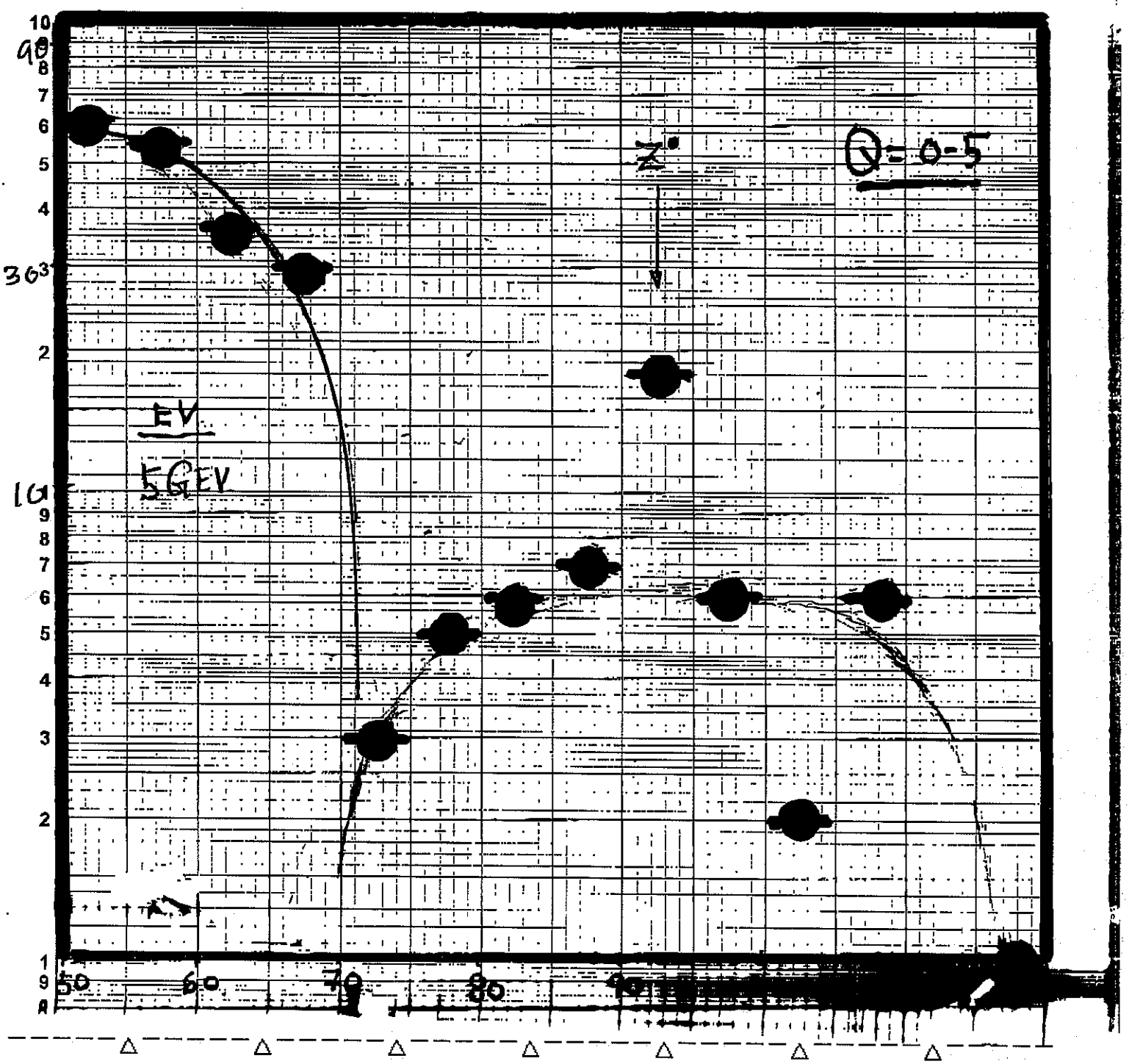
$m(\mu^+\mu^-)$ from $\mu^+\mu^- + jj$ final states

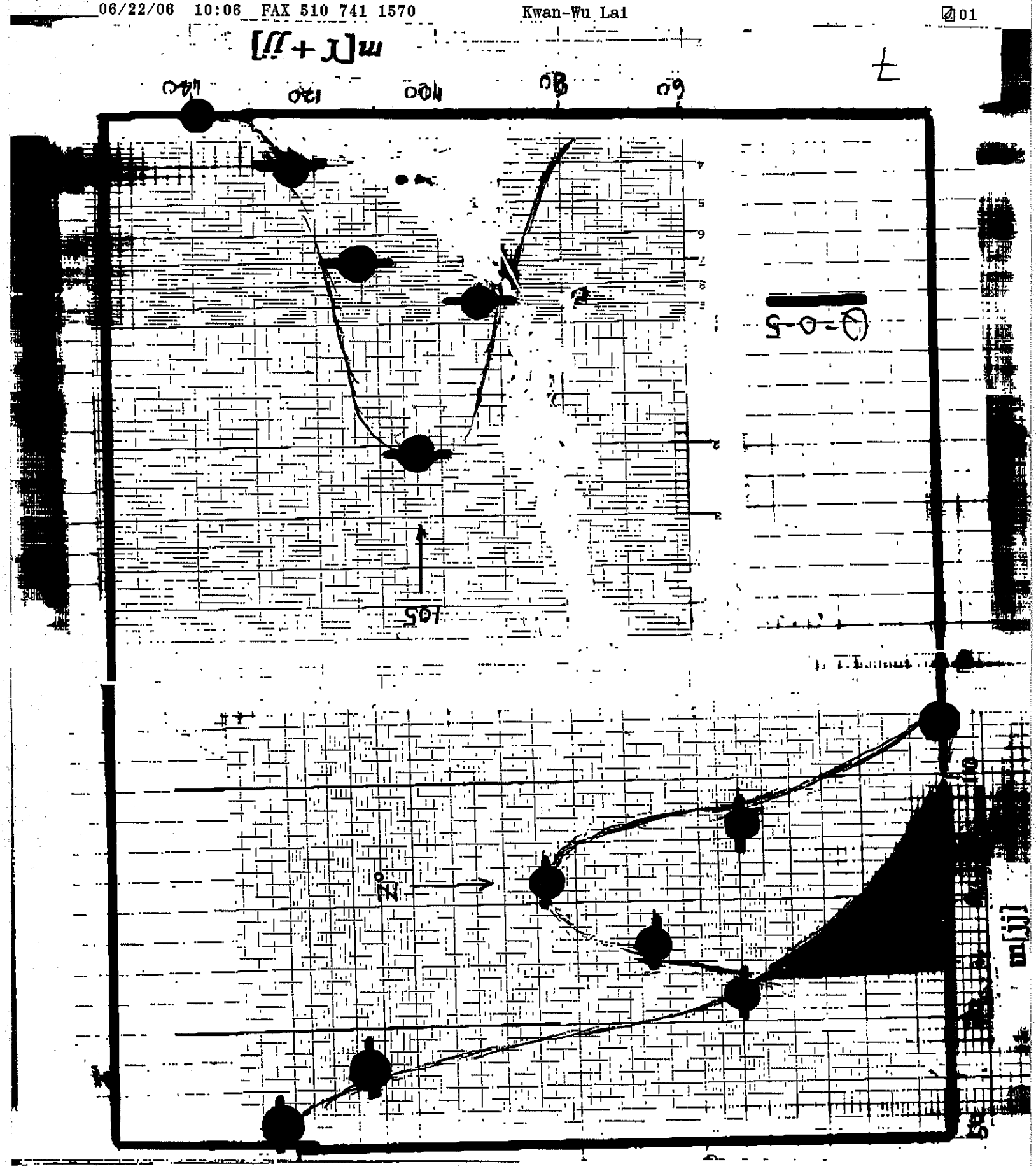


6

5

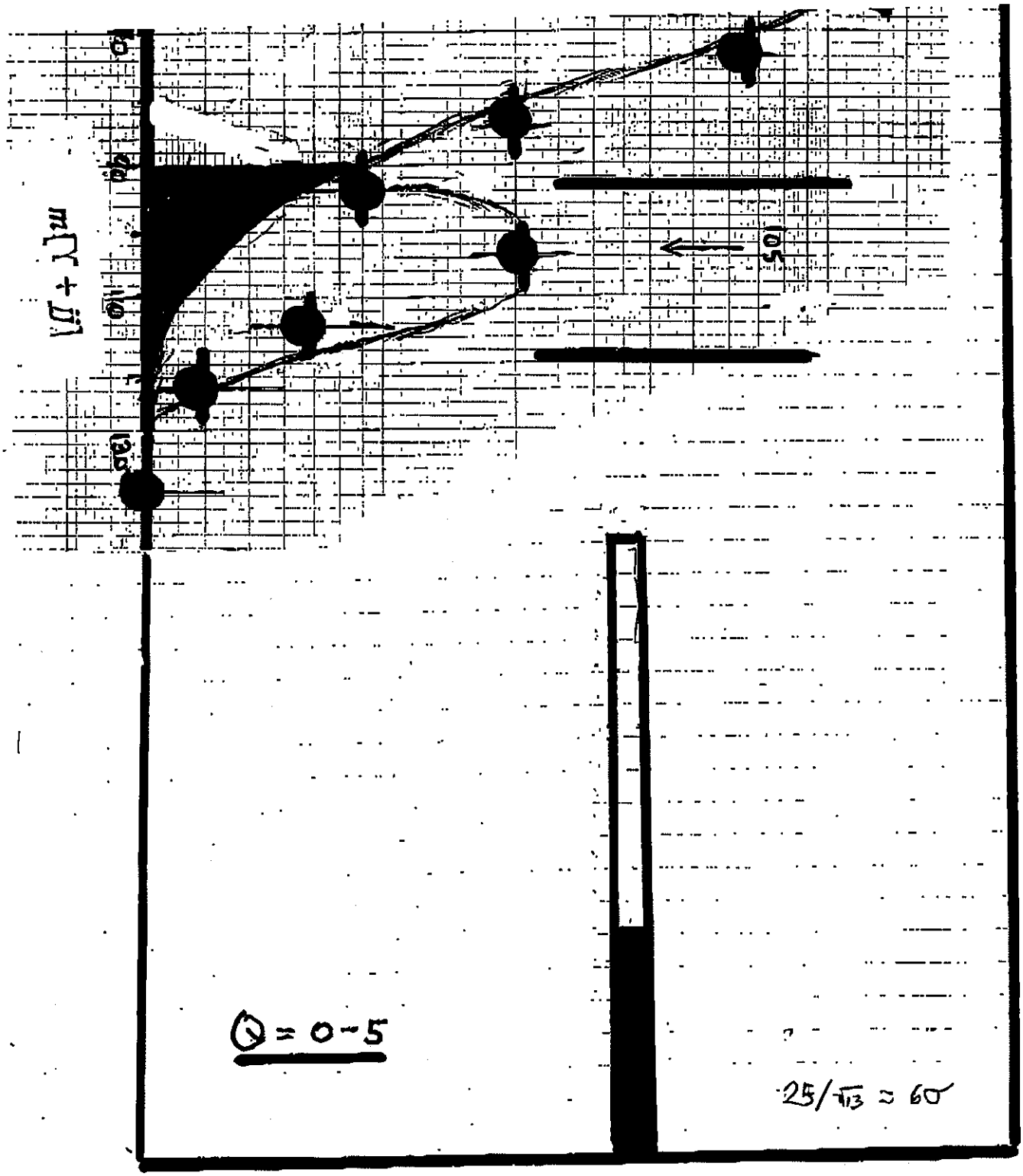
m[jj] / $m[\Upsilon + jj]$




60
80
100
120
140
m[Γ + jJ]
105
N°

Q

9

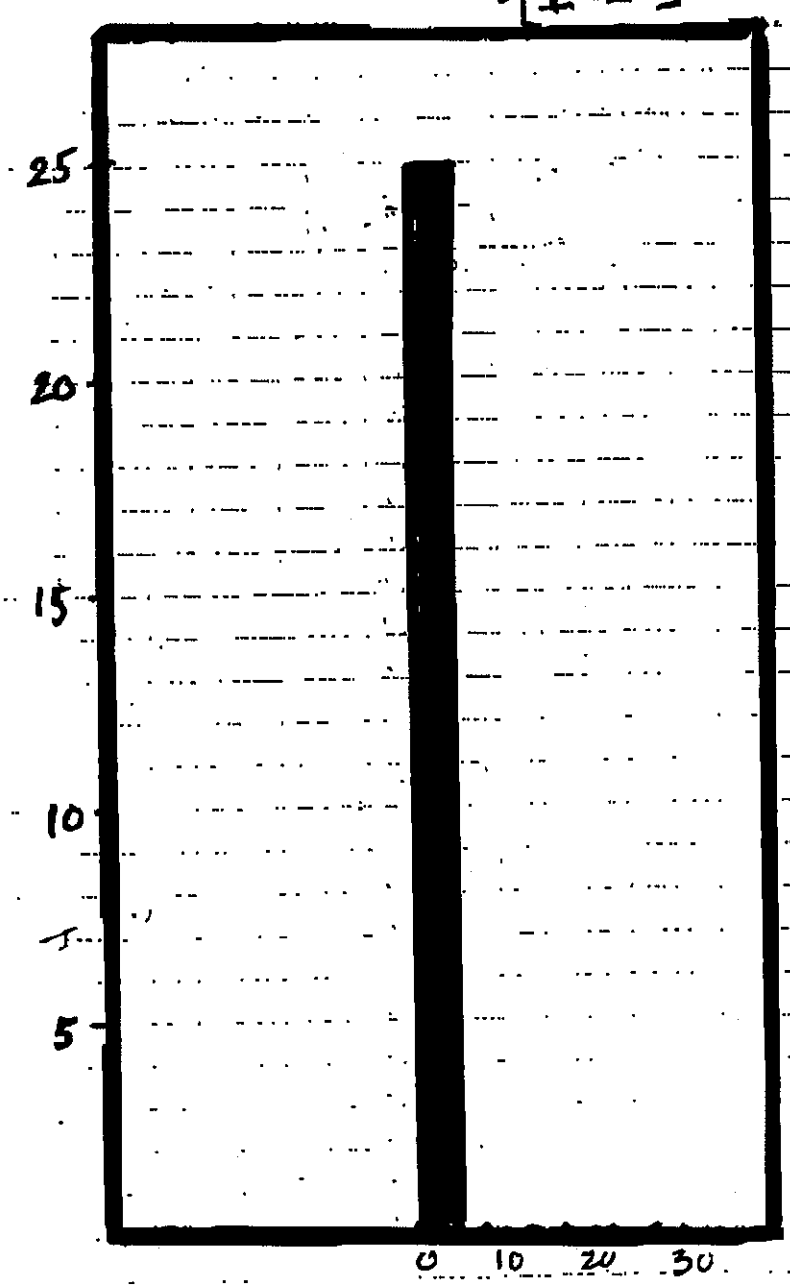

$m\Gamma + \bar{m}\Gamma$
0
20
40
60
80
100
120
50
Q = 0-5
$25/\sqrt{13} \simeq 6\sigma$

8

Q

EVENTS OF H IN Q PHASE SPACE

↳ [Σ + Z⁰]



[25 ev]

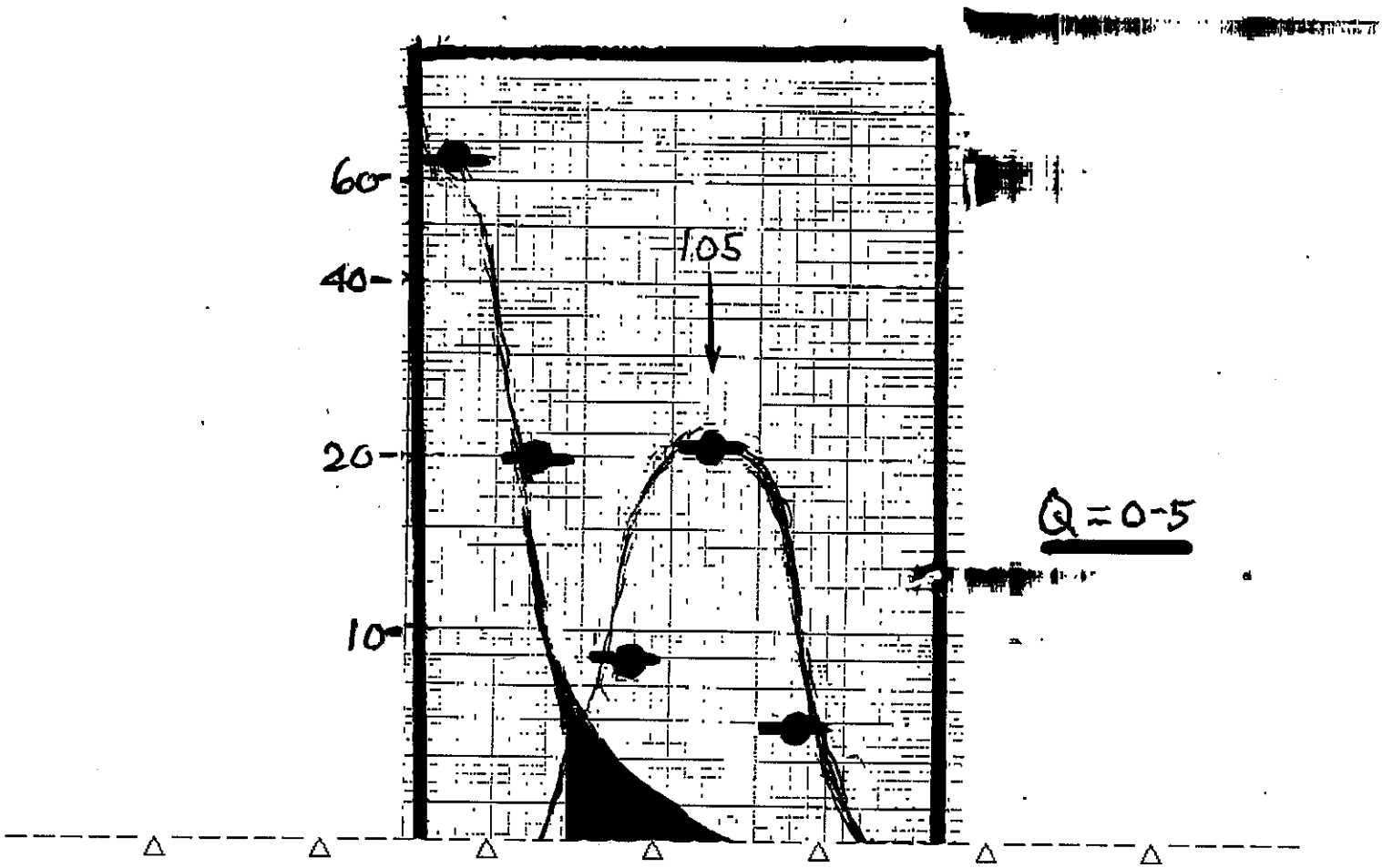
Q = 0 - 5

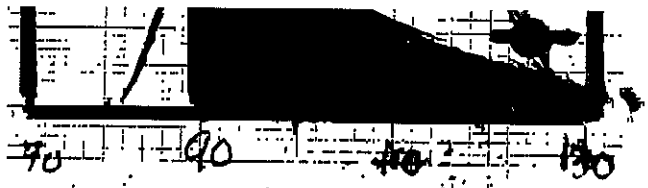
Run (III)

Our study

- $Z^0 \to jj / \Upsilon + jj$

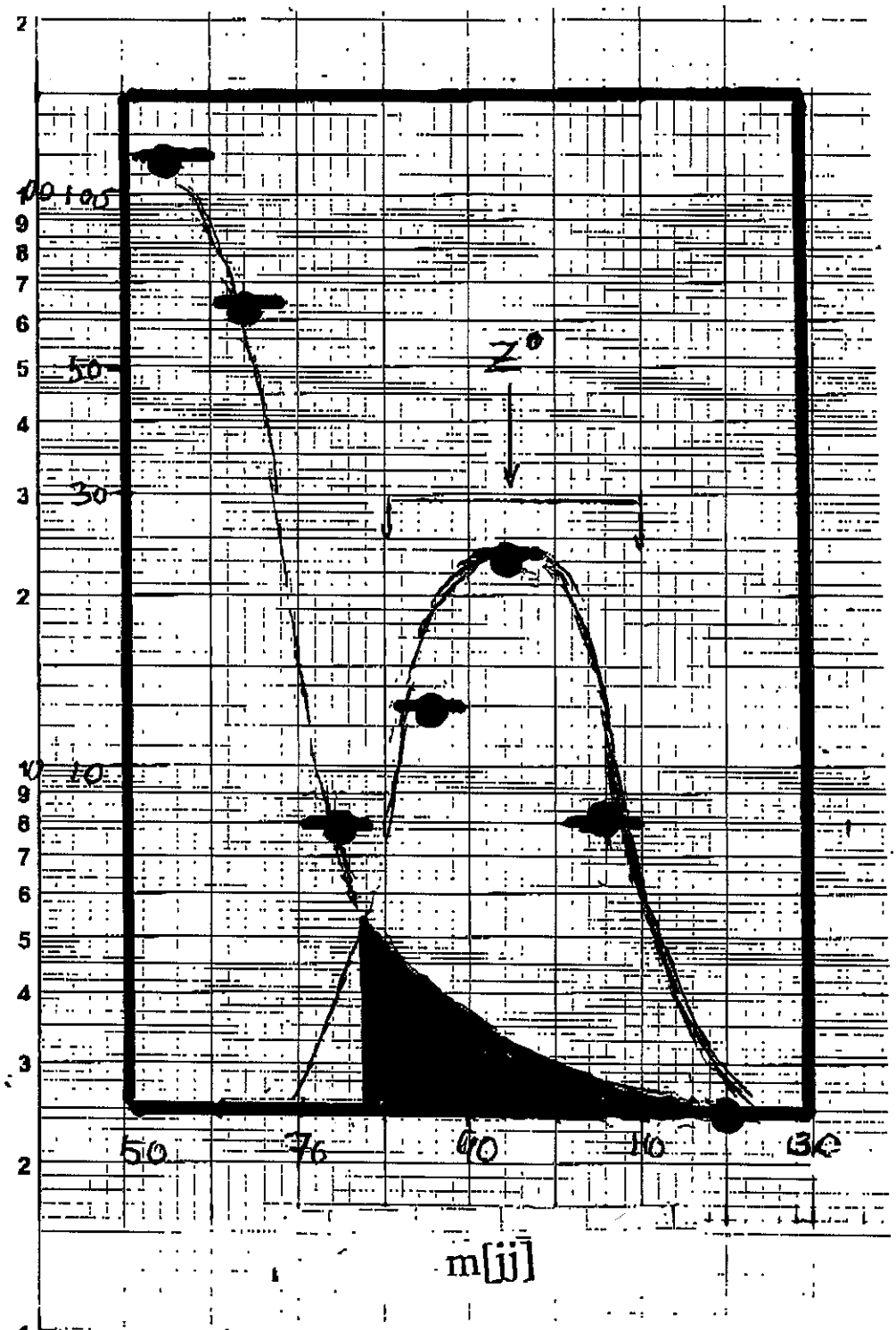
- $H(b\bar{b}) \to \Upsilon + Z^0$, $Z^0 \to jj$


60
40
20
10
1.05
Q = 0-5



Run(II)

$m[\Upsilon + jj]$



Run(II)

Q=0-5

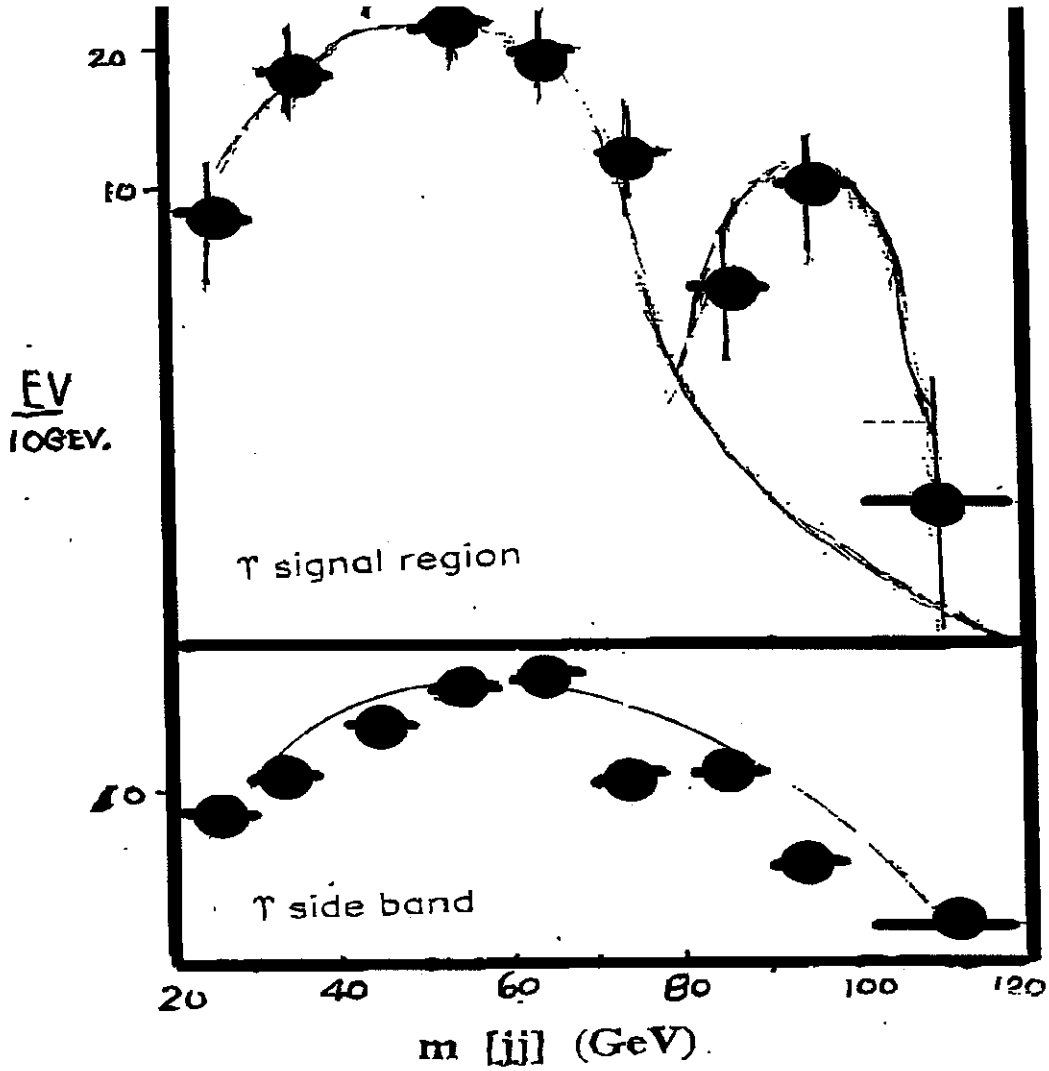
$m(\mu^+\mu^-)$ from $\mu^+\mu^- + jj$ final states

$\Upsilon \to \mu^+\mu^-$ (9.3 – 10.5) : Υ signal region

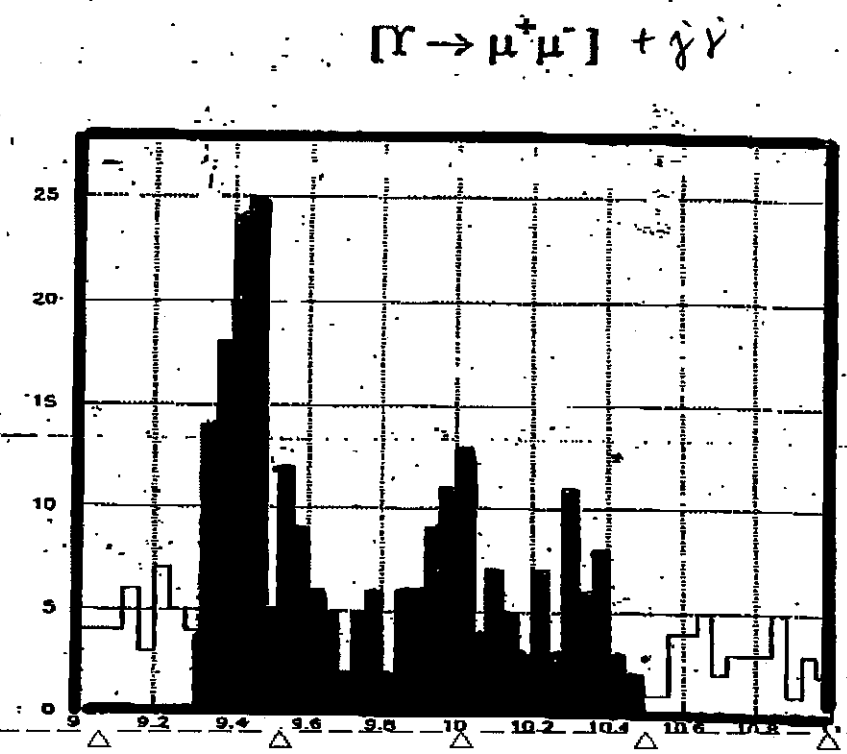
$\Upsilon \to \mu^+\mu^-$ (9.3 – 8.1)
(10.5 – 11.7) : Υ sideband

12

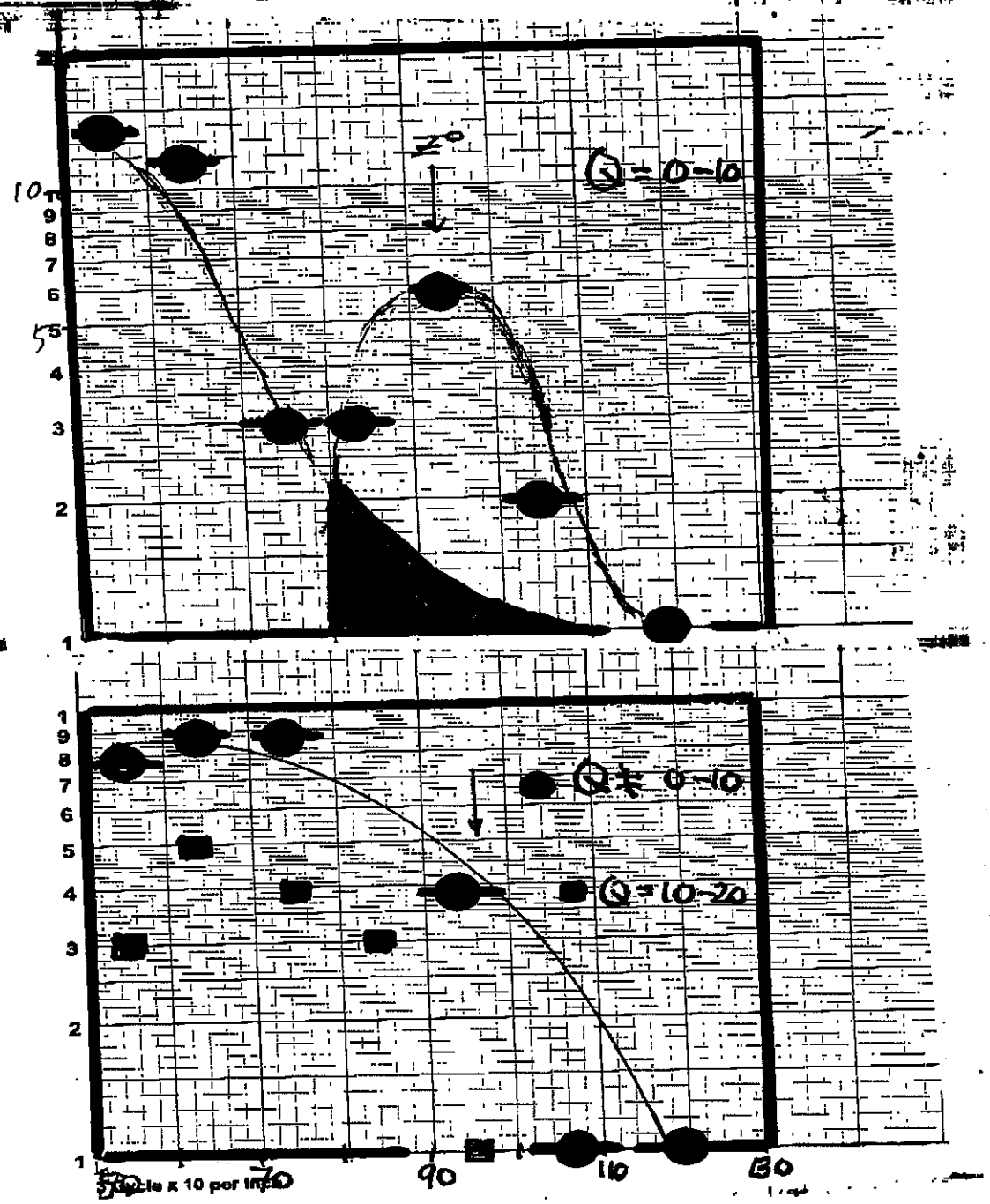
Run (I)


20
10
EV
10GEV.
ϒ signal region
10
ϒ side band
20
40
60
80
100
120
m [jj] (GeV)

13


[ϒ → μ⁺μ⁻] + γγ
25
20
15
10
5
0
9
9.2
9.4
9.6
9.8
10
10.2
10.4
10.6
10.8

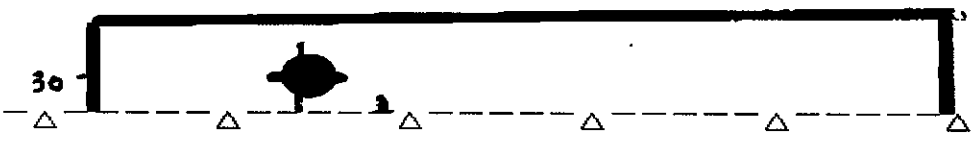
m[jj] / m[Υ + jj]

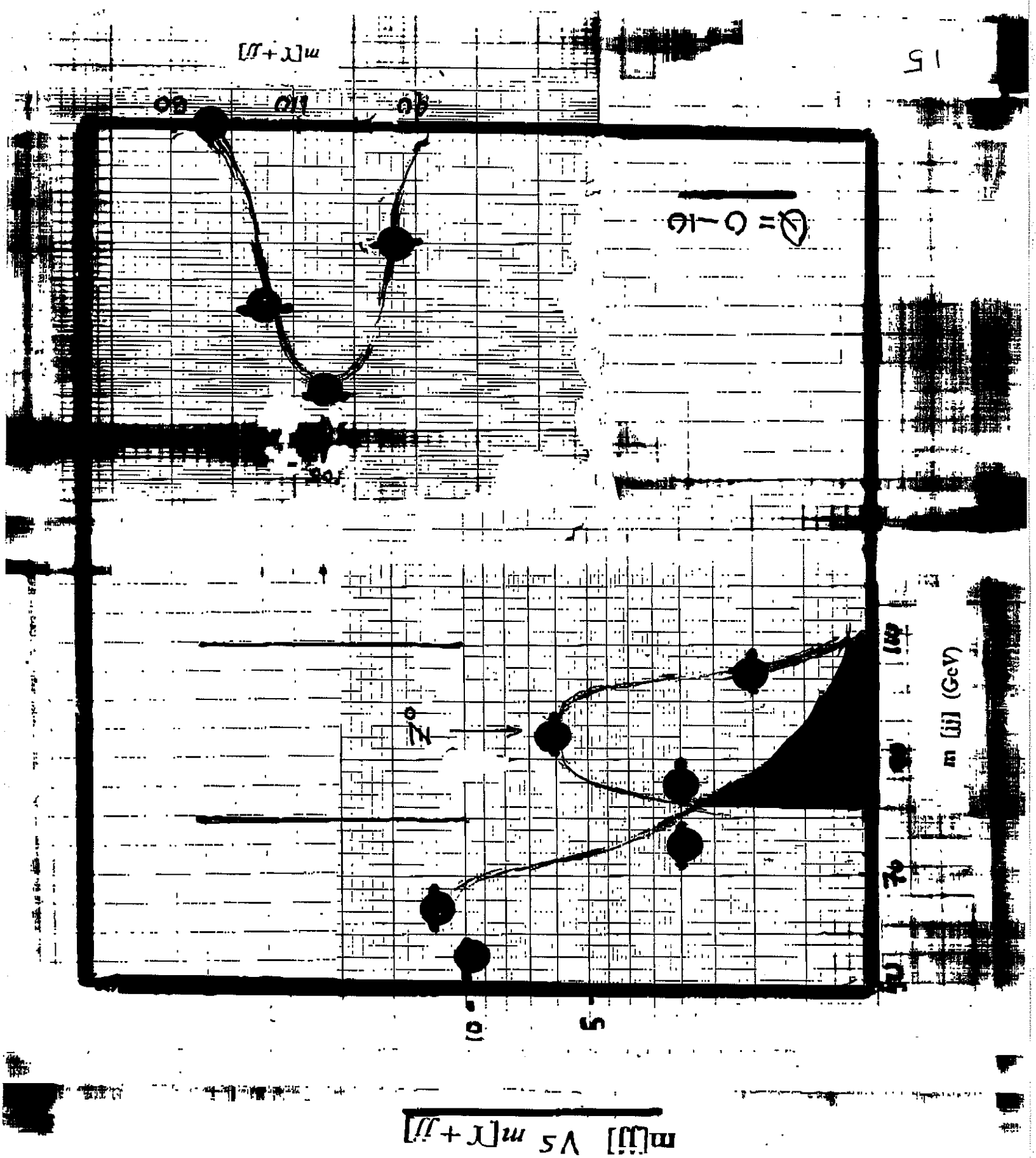


m[jj]

14

m[jj] / m[Υ + jj]

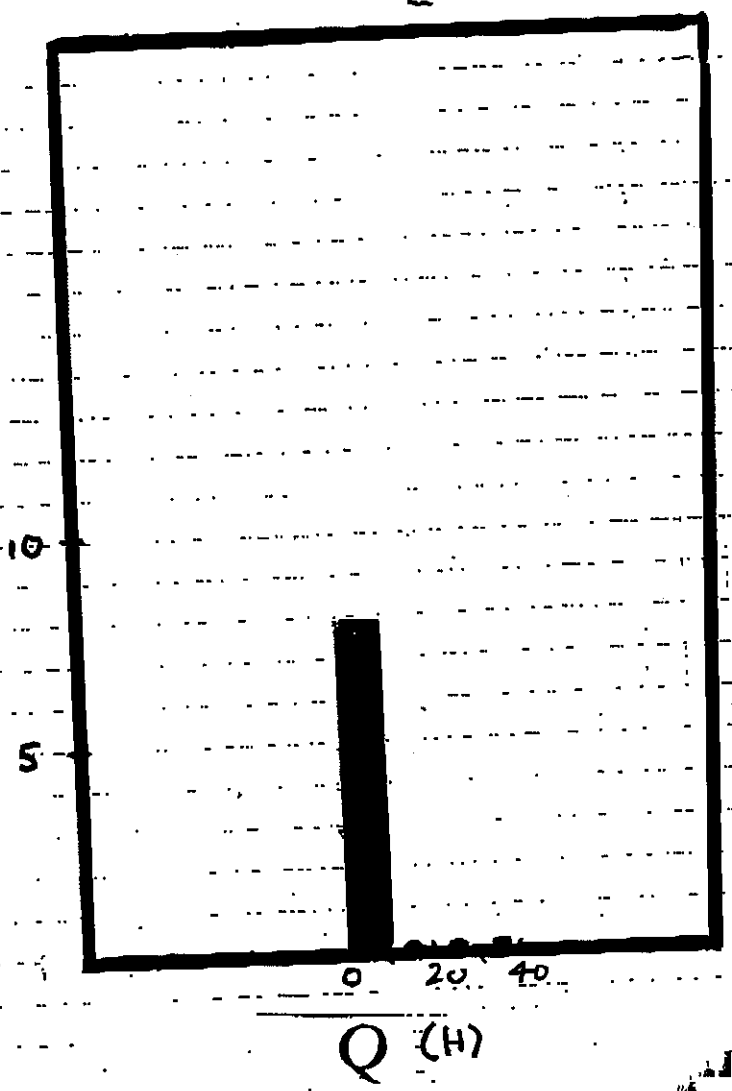



m [J/ψ] (GeV)
m[Υ + J/ψ]
m[J/ψ] vs m[Υ + J/ψ]
15

m[Υ + jj] vs [Q]
12 events
8 signal
m[Υ + jj]
120
110
100
90
70
Q
Q = 0-10
H° → Υ + Z° [8/12] ~ 40

EVENTS OF H IN Q PHASE SPACE

[Υ + Z°]



[8] ev.

Q = 0-10

Run (I)

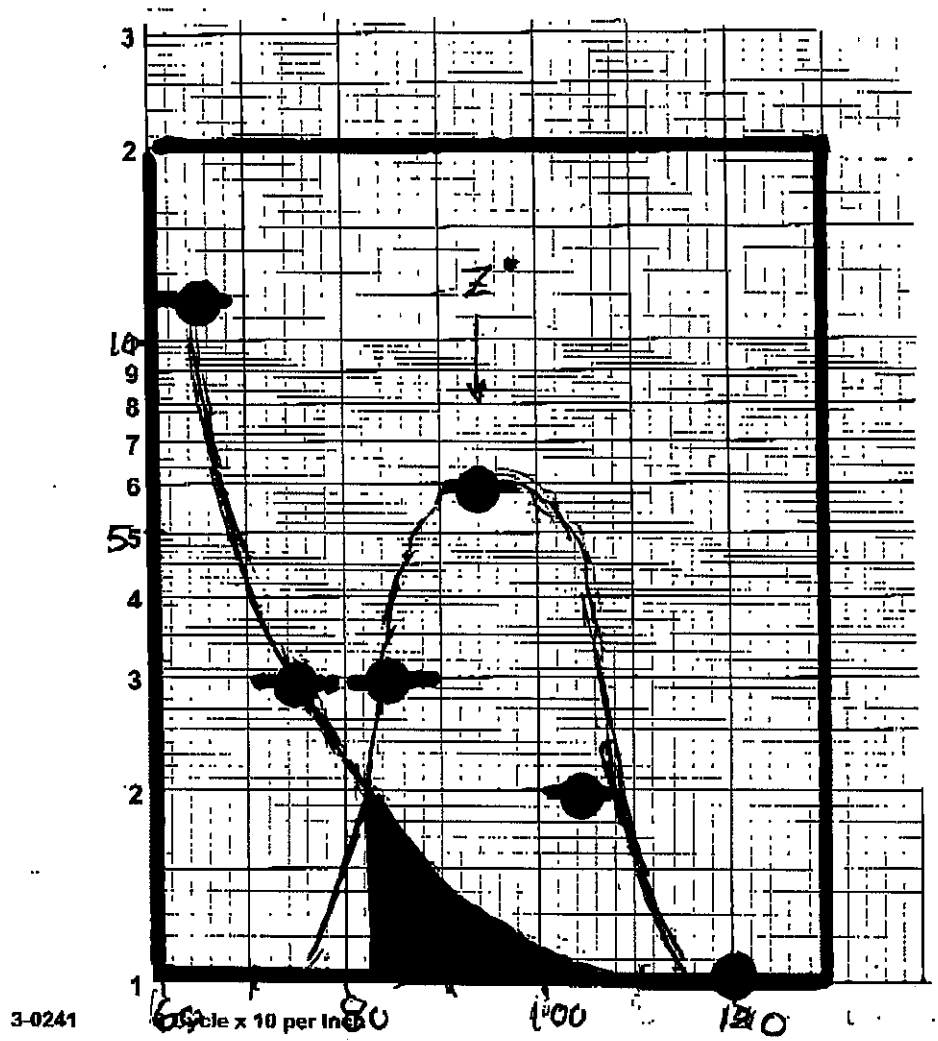
Our study

- $Z^0 \to j\,j / \ell + j\,j$

- $H(b\bar{b}) \to \ell + Z^0$
  $\hookrightarrow j\,j$

19

Run(I)



Q = 0-10

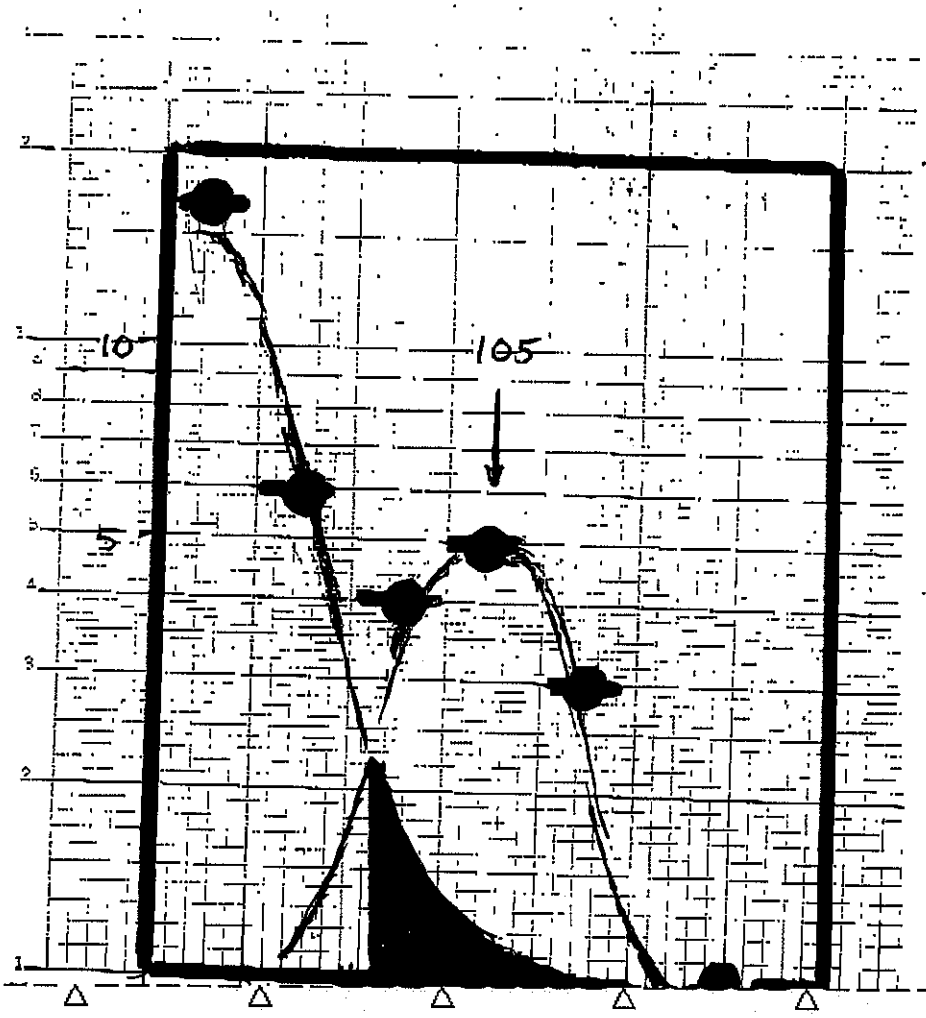
m[jj]

18

Run(I)

m[I + jj]

Tenths to the inch 40 40 110 130



Q = 0-10

REMARK from

Marty PERL

---- Original Message -----
From: "Perl, Martin L." <martin@SLAC.Stanford.EDU>
To: <kwanwulai@msn.com>

>
> Dear Kwan:
>
> I read your interesting notes on your Higgs search.
>
> Unfortunately I know nothing about the Higgs search literature.
>
> I think one main question is whether there have been similar search procedures with different results. using the upsilon(1S) + Z decay mode.
>
> The other main question is whether your colleagues will agree to publication with you. If not, what are their objections?
>
> Regards
>
> Martin
>

20

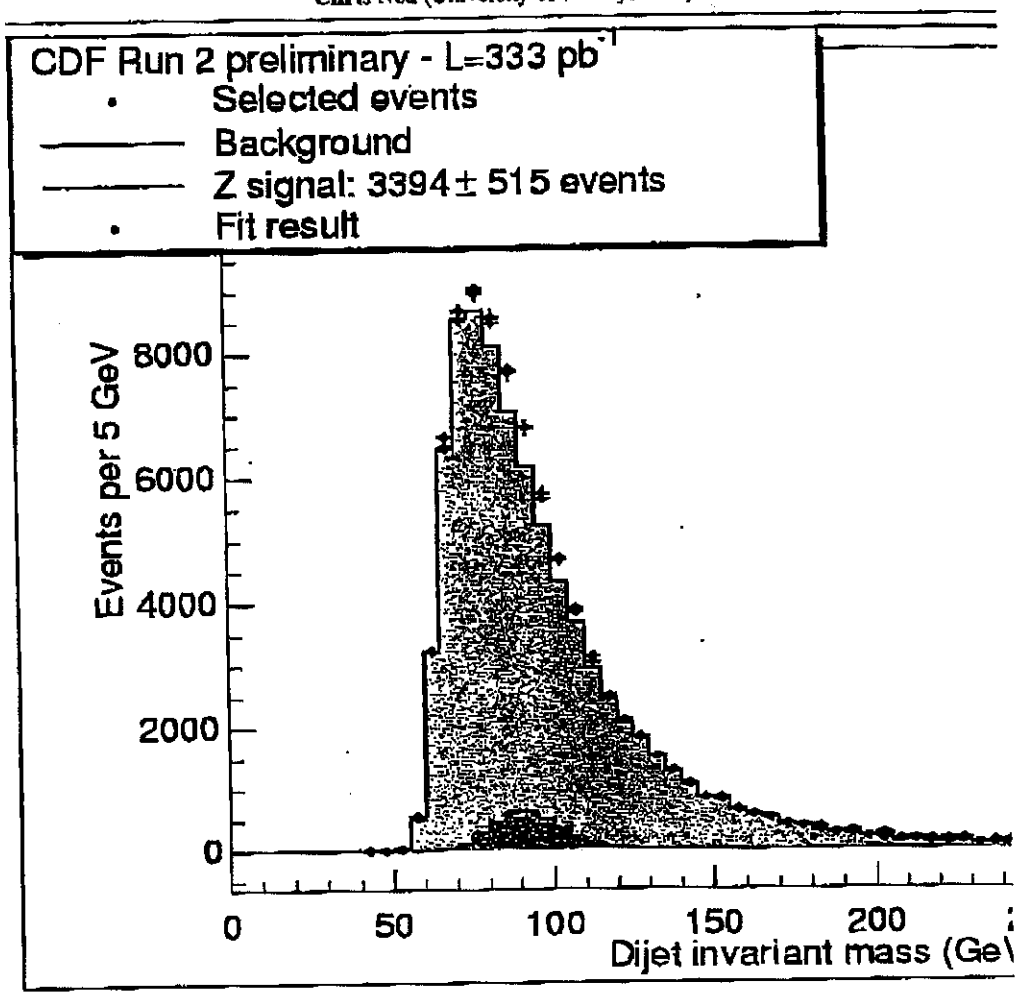
CDF Study

- $Z^0 \to j(b)\, j(b)$

- $W + H(b\bar{b})$
  $\hookrightarrow j(b)\, j(b)$

Z->bb analysis: Blessed PR Plot

Giovanni Busetto, Julien Donini, Tommaso Dorigo (University of Padova and INFN)
Mel Shochet (University of Chicago)
Chris Neu (University of Pennsylvania)



The figure shows the dijet invariant mass of 85,794 events with both jet containing a secondary vertex b-

http://www-cdf.fnal.gov/physics/exotic/r2a/20050218.zbbbar/ 3/25/05

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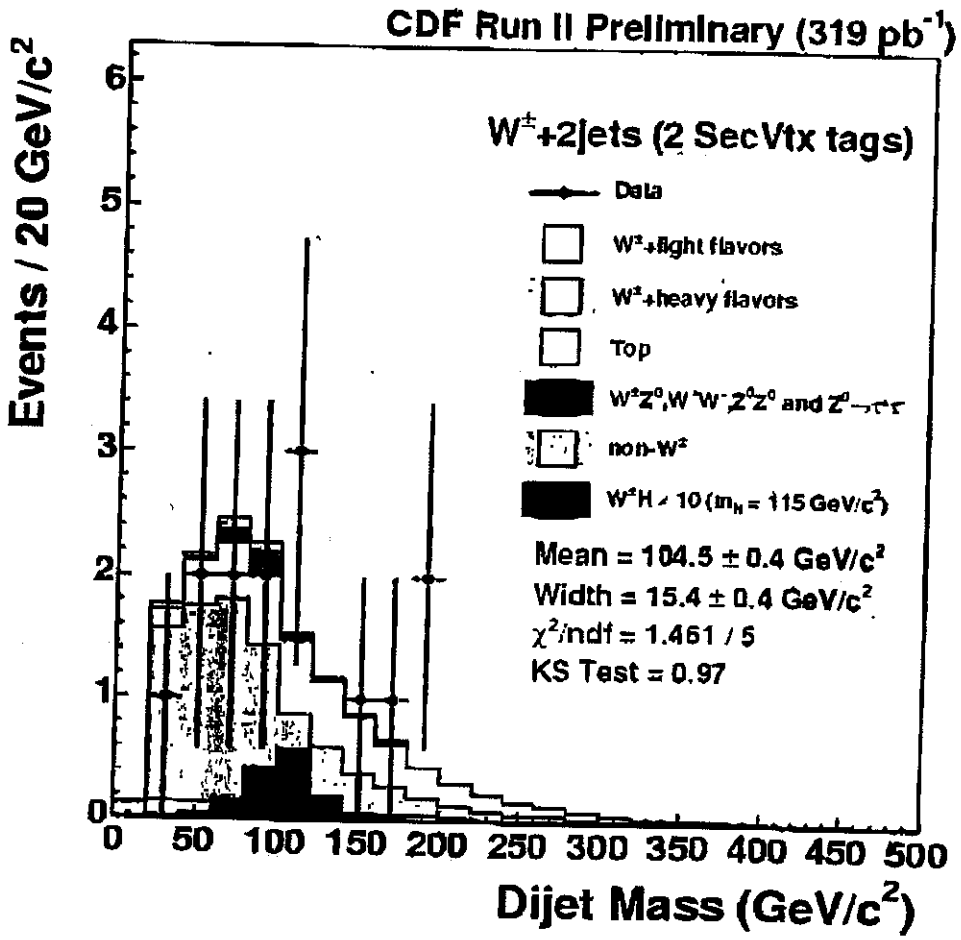
Search for New Particles Decaying into bb and Produced in Association with W Boson



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