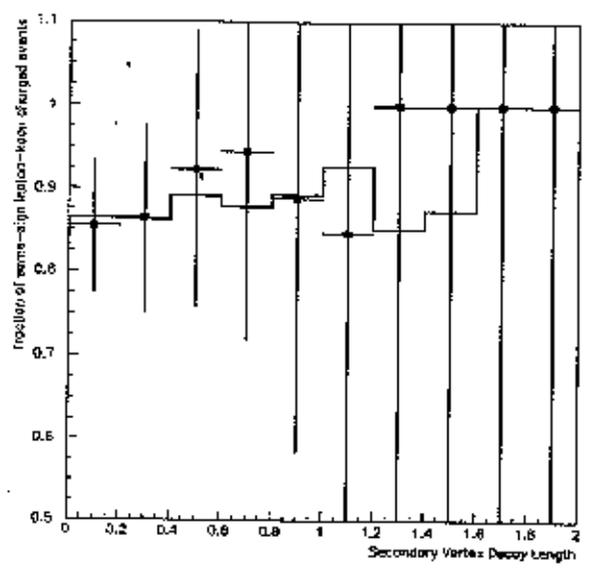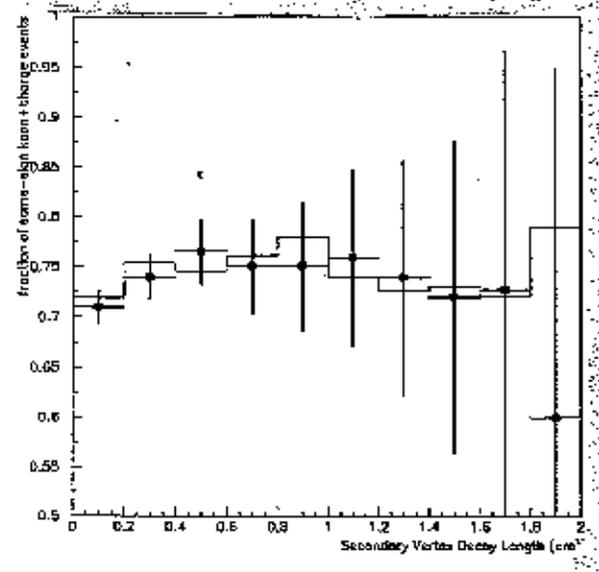# B_d Mixing Update

1. More leptons + kaons
   - Decay length + $\cos \theta$

2. Kaon P_T spectra

3. Charge resolution

3.5 Initial state Double tags.

4. A_{FB} lots of different ways.

5. Baryon Systematics

6. B_s systematic study

7. Minor oopsie, big-gish effect!

Kaons in Decay Length

lep + Kaon w/chrgd vtx

↑
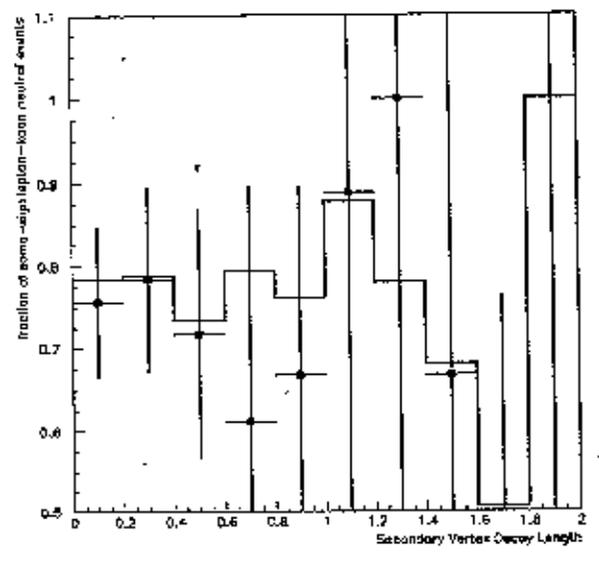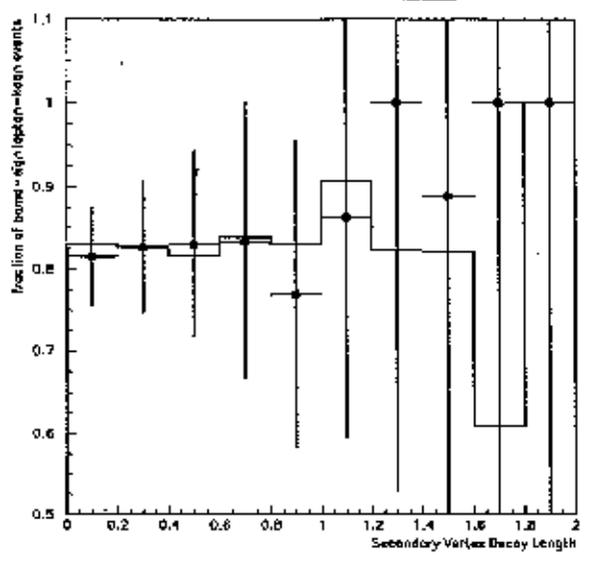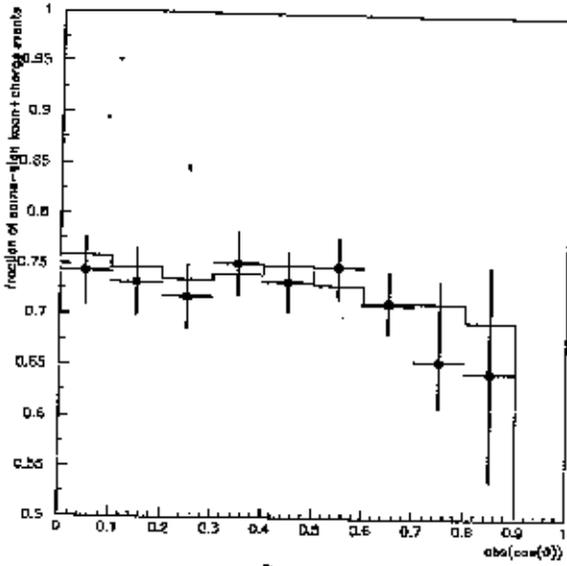
vtx chrg + Kaon

↑

φ Data
— MC

lep + Kaon all events
↓

lep + Kaon neutral events
↓

Kaons in cos θ

2001/02/07 12.44

fraction of same-sign kaon+ charged events — abs(cos(θ))

vtx charged Kaon

2001/01/30 15.41

fraction of same-sign lepton-kaon charged events — abs(cos(θ))
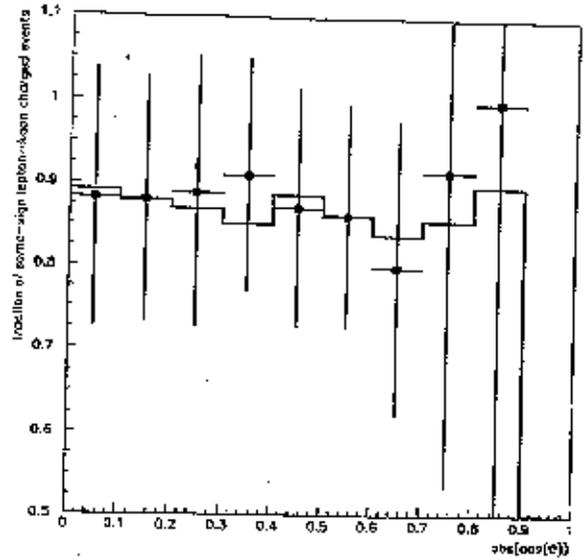
lepton + Kaon charged events

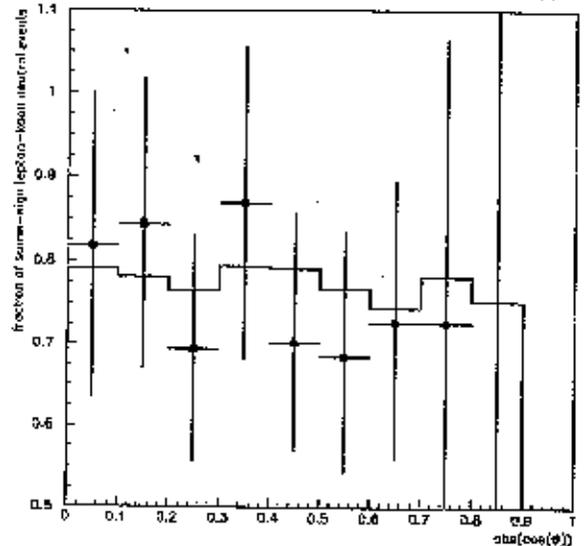+ Data
− MC

lepton + Kaon all events

fraction of same-sign lepton-kaon all events — abs(cos(θ))

lepto + Kaon neutral events

fraction of same-sign lepton-kaon neutral events — abs(cos(θ))

DW-3
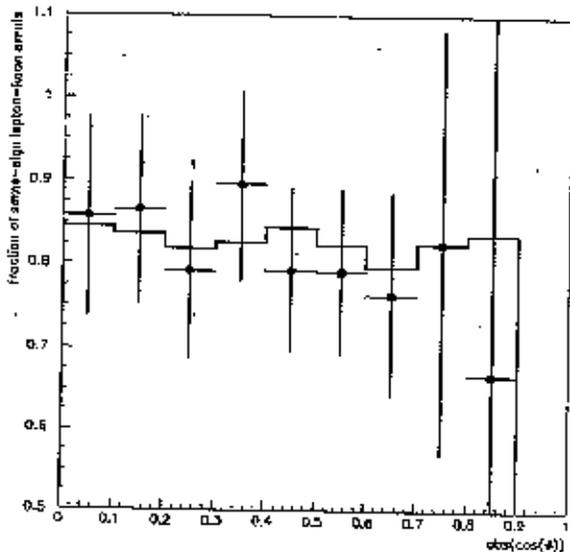
Kaon P_T wrt B

2001/02/08 11.32

Kaon (from Tertiary Vertex) p_T

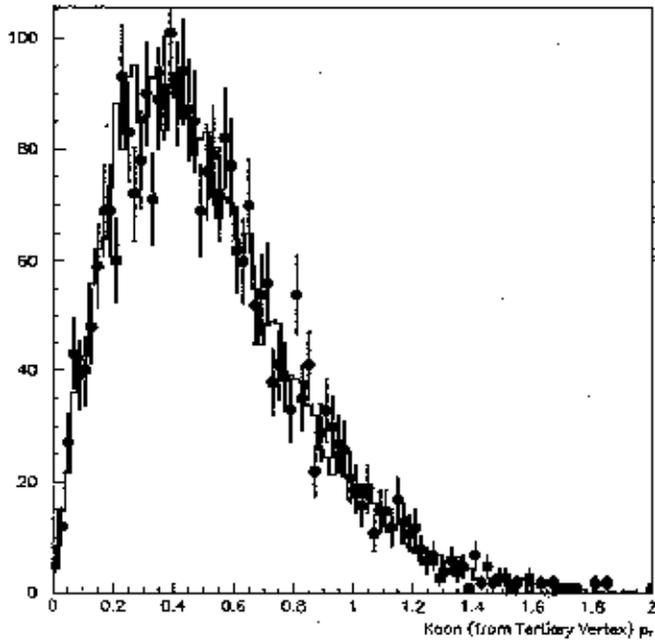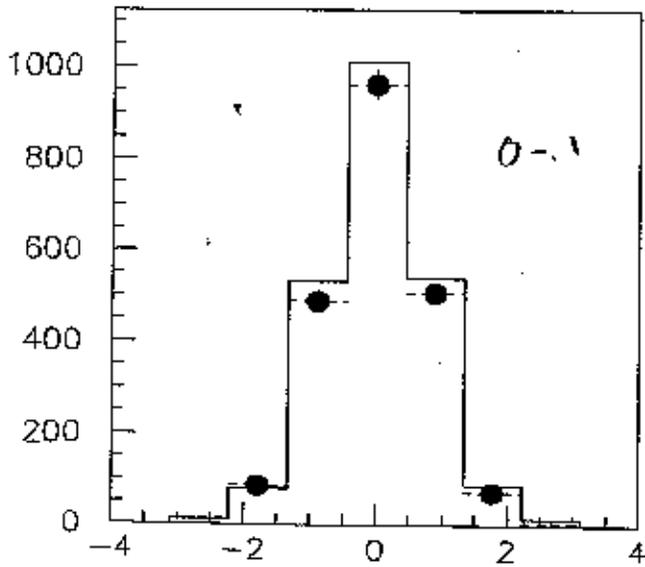Kaon (from Secondary Vertex) p_T
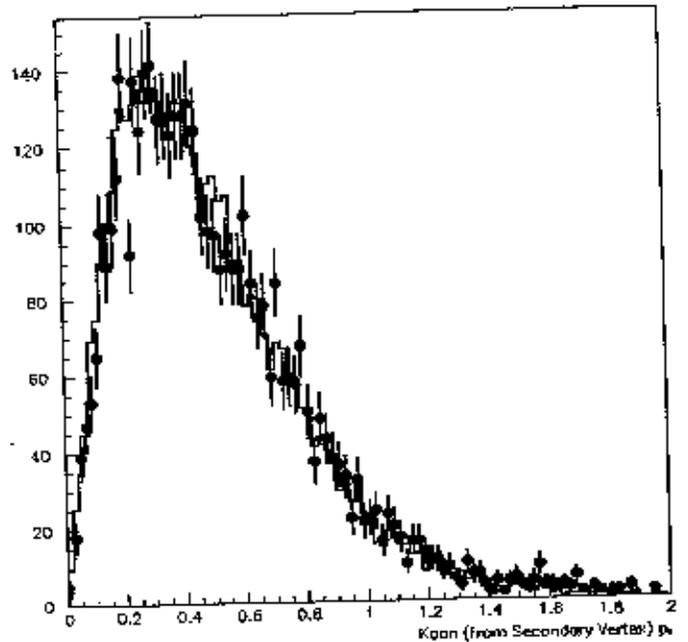
- Su Dong suggested I check this.
- No obvious problem to my eye.

JLW-4

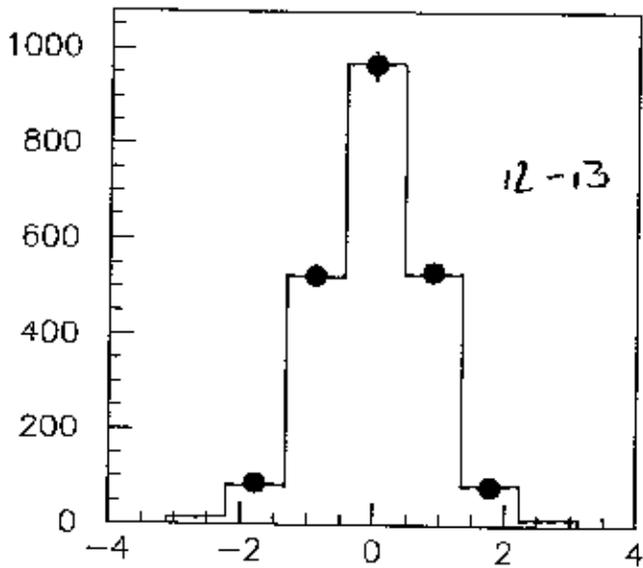Charge resolution w/t $\sigma(\cos\theta)$.
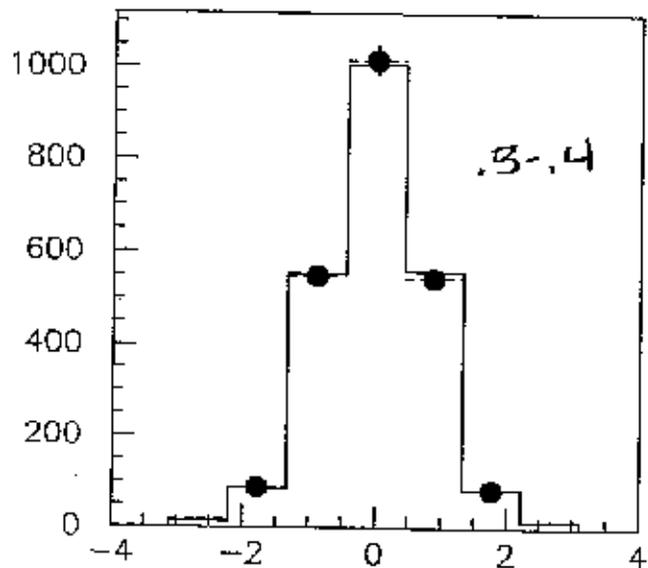
see B's w/t $\cos\theta$

● Data

— MC

0-.1

.1-.2

.2-.3

.3-.4

data 1

JLW-5

.4-.5

data 1

.5-.6

data 1

.6-.7

data 1

.7-.8

data 1

DW-6
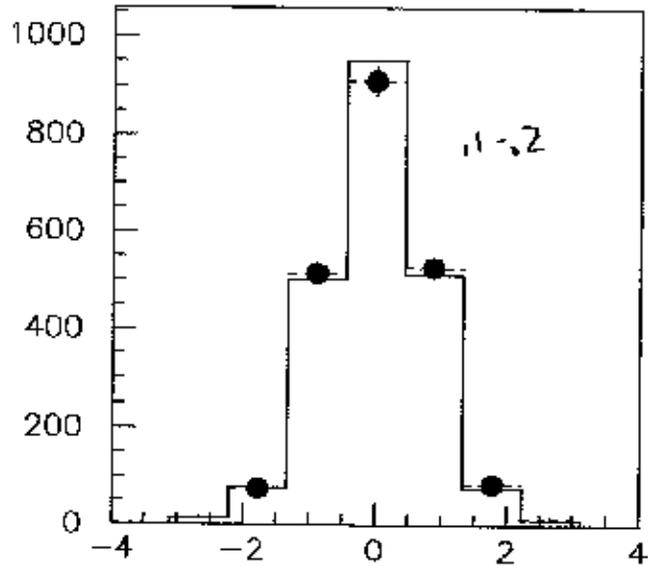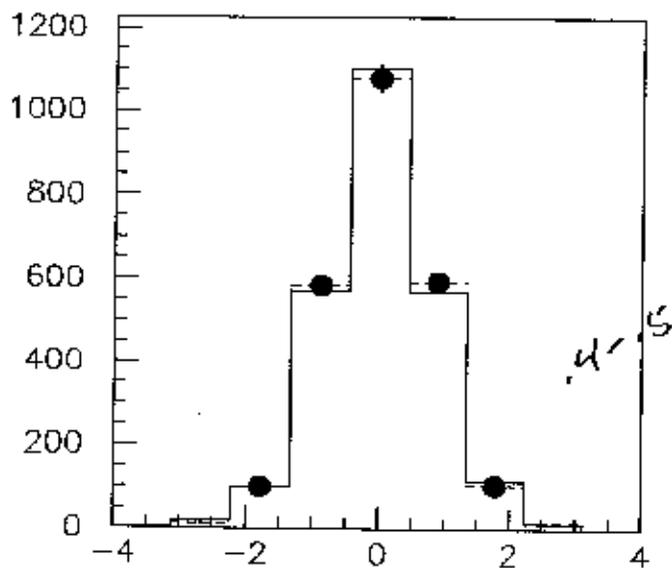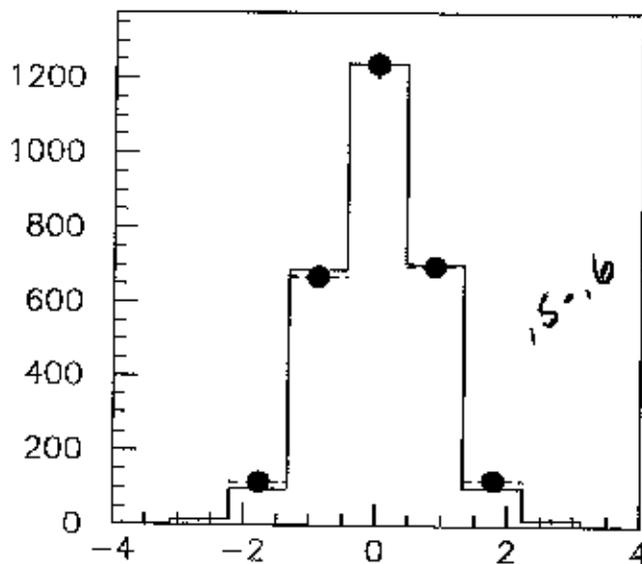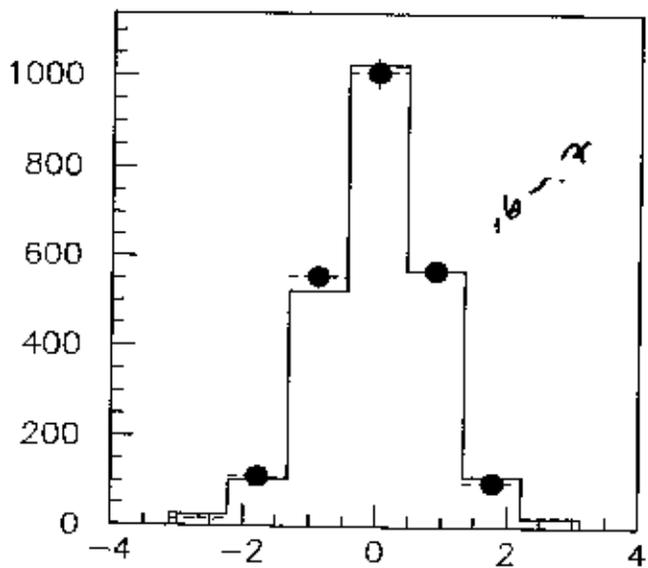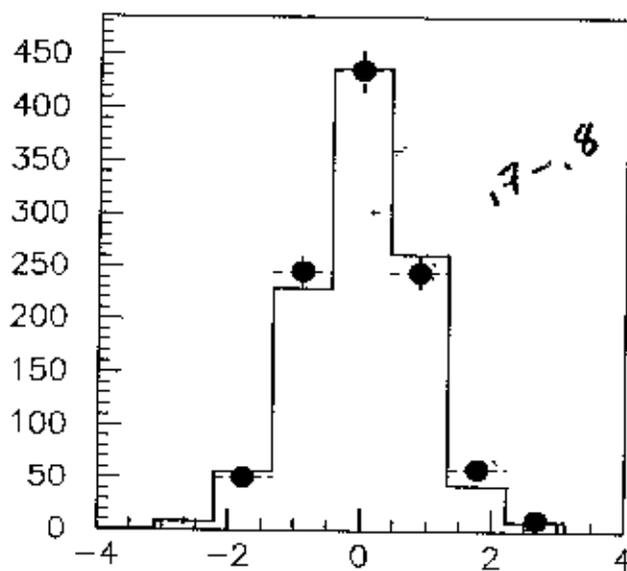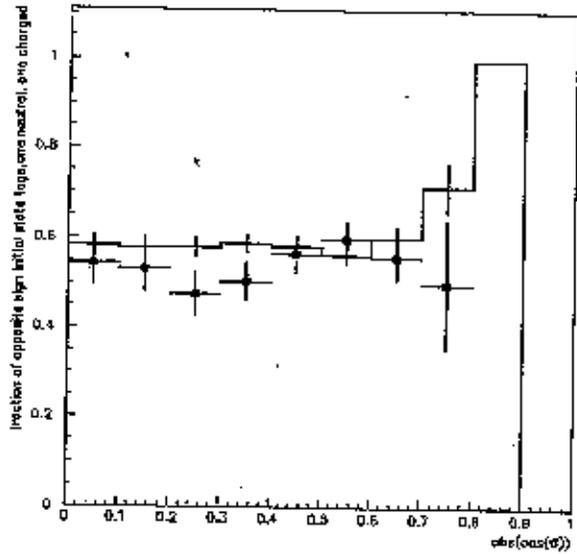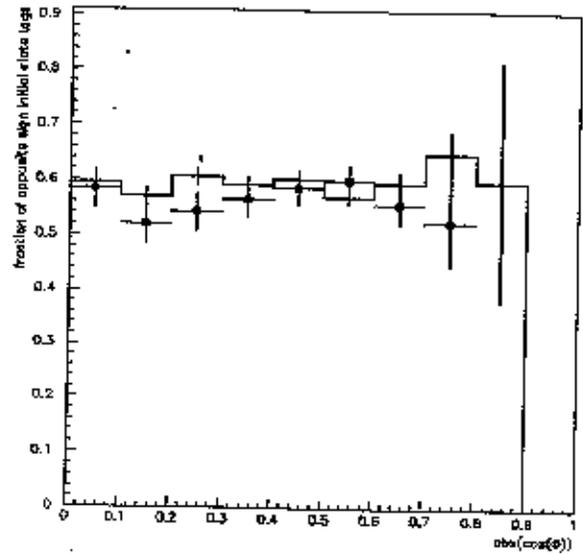
Double tagged events-
Charged Initial State Tags.
$Data
—MC
$\left(\begin{array}{l}1\ \text{hemi}=b \\ 1\ \text{hemi}=\bar{b}\end{array}\right)$
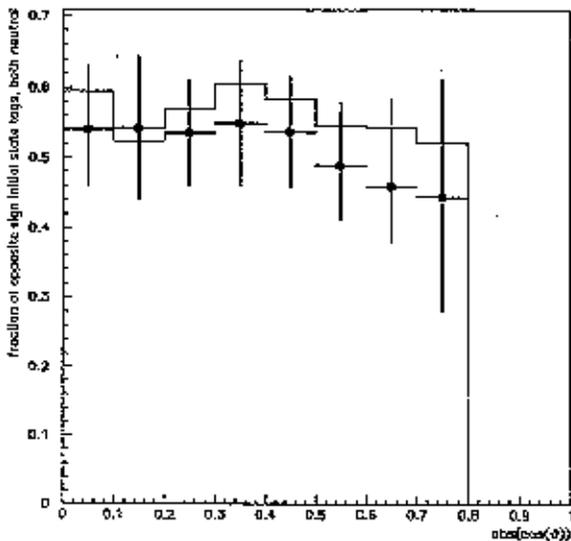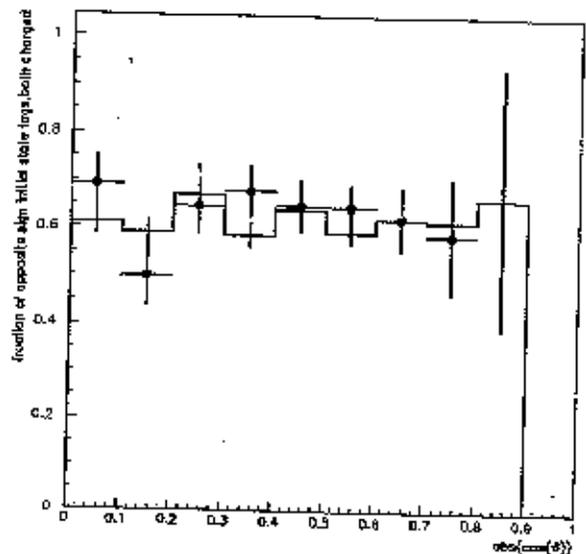
JWB

Fitting Function

$$-Ap2Pe \cdot \frac{x}{1+x^2} \cdot (1-z\langle\omega\rangle)$$

↖ Fit variable

2001/02/13 17.12
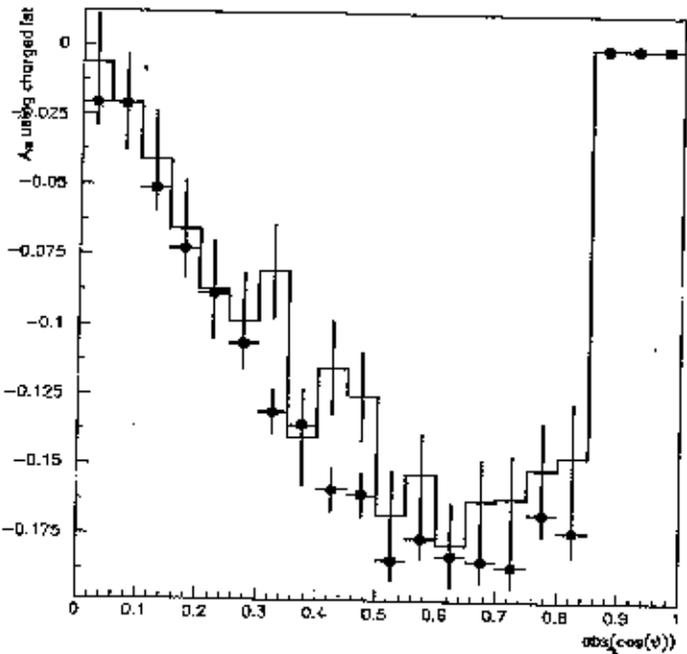
Data   .372 ± 4.12·10⁻³

MC   .354 ± 1.95± 10⁻³
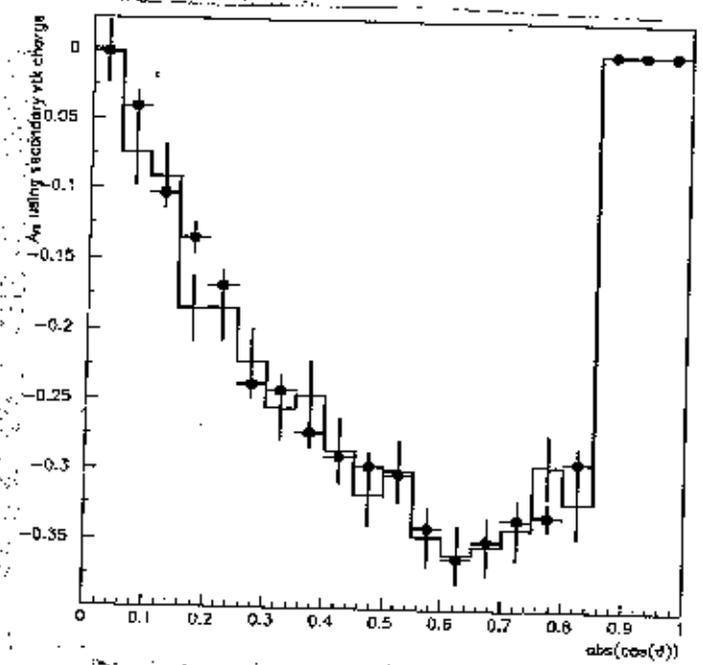
Data   .2245 ± 5.611·10⁻³

MC   .227 ± 2.63·10⁻³

◆ Data
— MC   no Event cuts (just cmass >2)

Data   .368 ± 5.41·10⁻³

MC   .355 ± 2.55·10⁻³

Data   .377 ± 6.36·10⁻³

MC   .351 ± 3.01·10⁻³
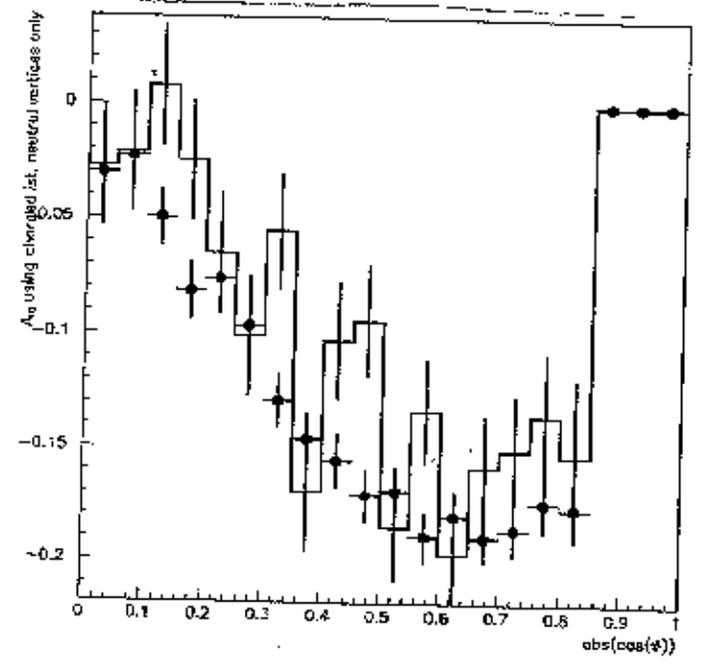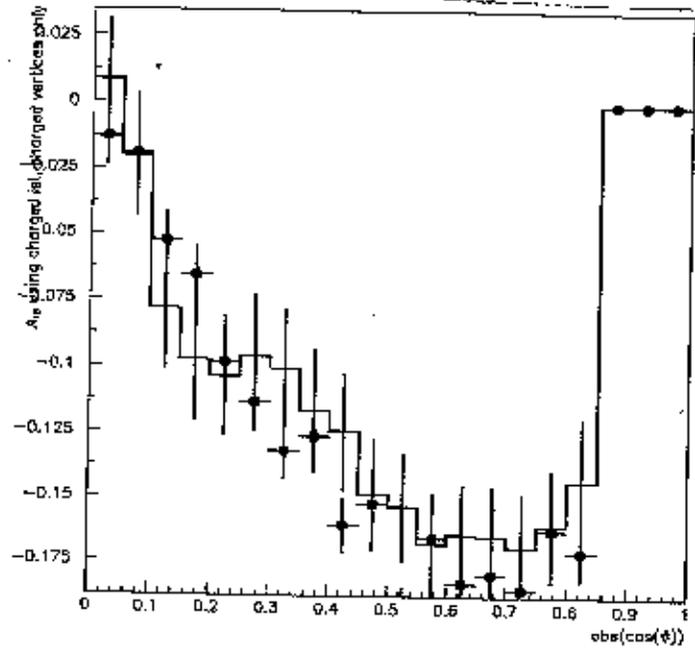
JLW-8
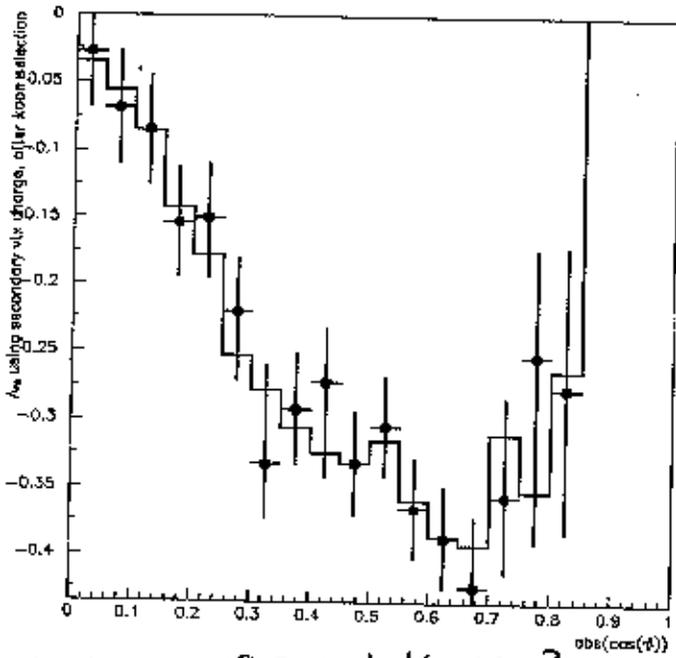
Data $.197 \pm 1.16 \cdot 10^{-2}$

MC $.195 \pm 5.41 \cdot 10^{-3}$
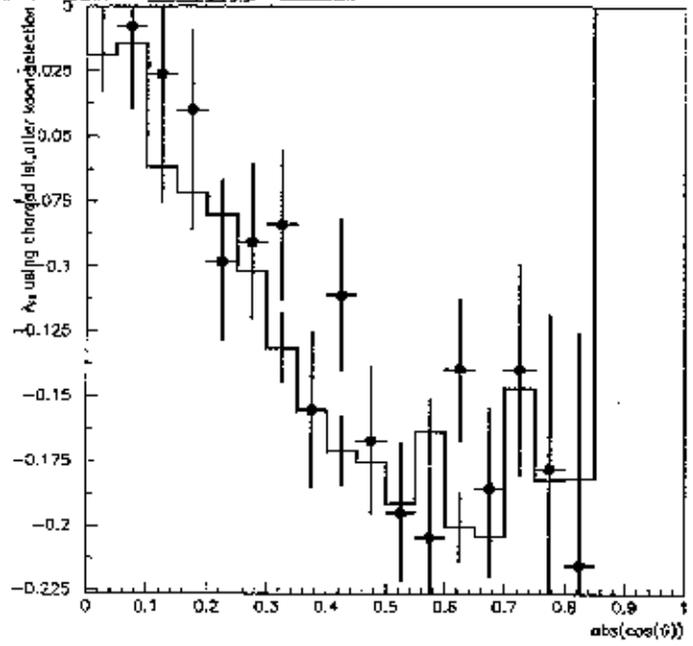
Data $.358 \pm 8.35 \cdot 10^{-3}$

MC $.344 \pm 3.96 \cdot 10^{-3}$

$\blacklozenge$ Data

— MC

After Kaon Event Selection

Data $.352 \pm 1.16 \cdot 10^{-2}$

MC $.348 \pm 5.22 \cdot 10^{-3}$

Data $.367 \pm 1.30 \cdot 10^{-2}$

MC $.338 \pm 6.05 \cdot 10^{-3}$

A_N using klog, all events after kaon selection — obs(cos(ϑ))

A_N using klog, charged events after kaon selection — obs(cos(ϑ))
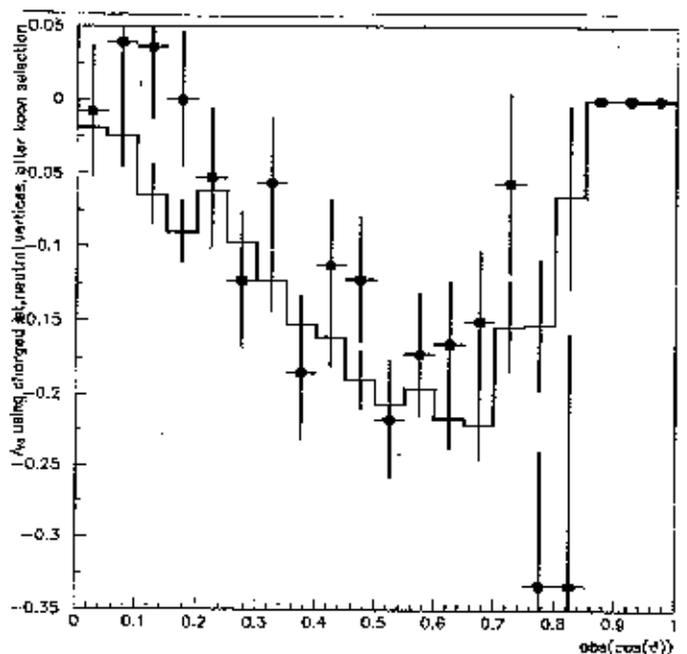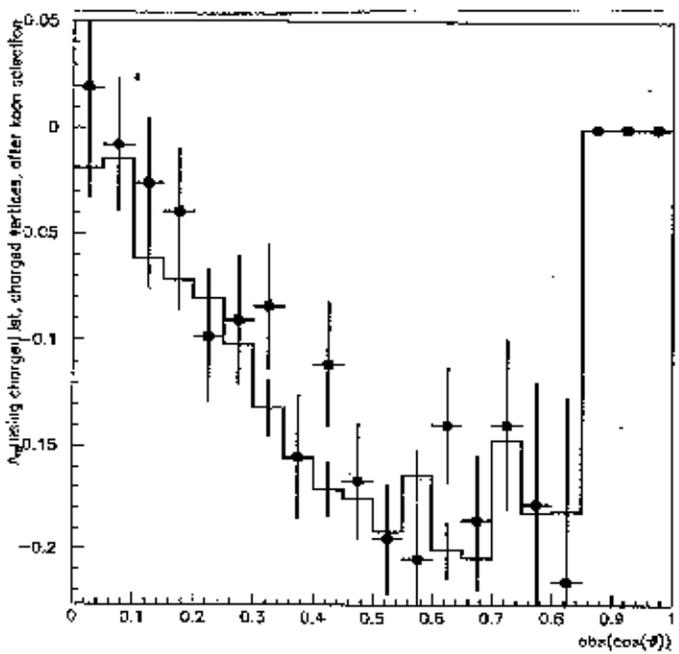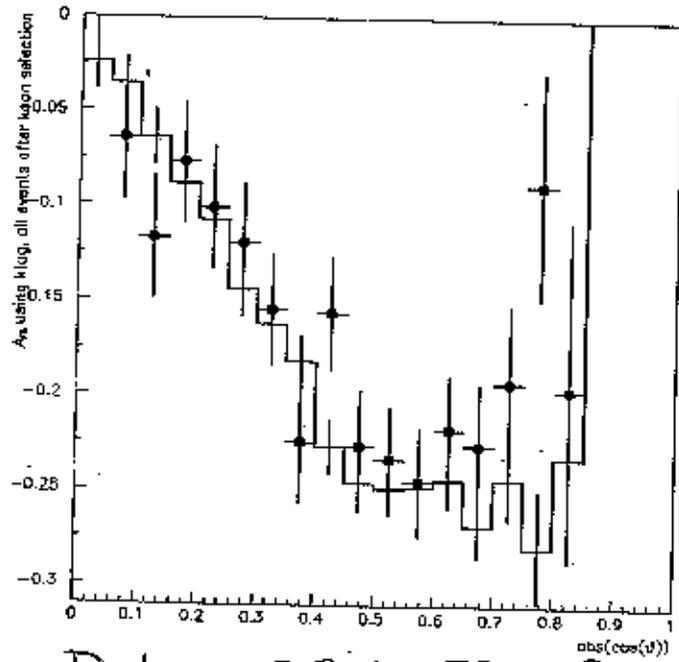
Data $.313 \pm 8.72 \cdot 10^{-3}$
MC $.290 \pm 4.16 \cdot 10^{-3}$
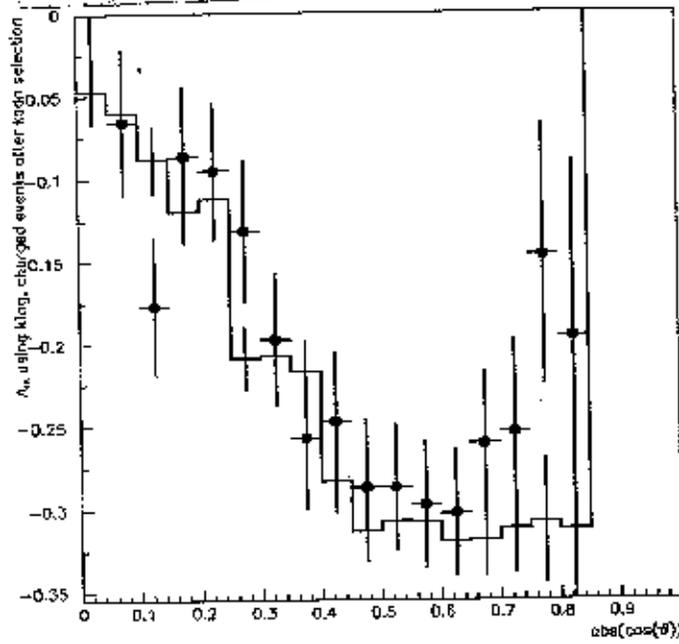
Data $.265 \pm 1.18 \cdot 10^{-2}$
MC $.238 \pm 5.55 \cdot 10^{-3}$

• Data
— MC   Use Kaon Tag to sign

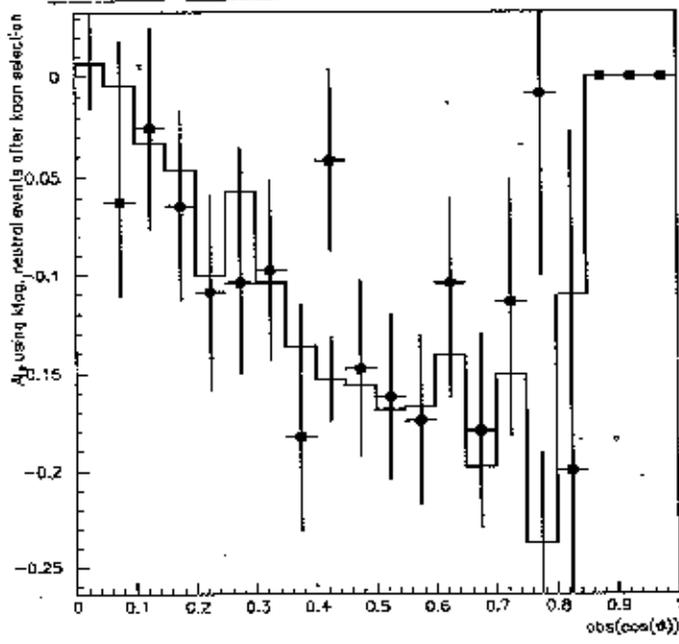Data $.378 \pm 1.32 \cdot 10^{-2}$
MC $.362 \pm 6.312 \cdot 10^{-3}$

A_N using klog, neutral events after kaon selection — obs(cos(ϑ))

Baryon + B_s Systematics

1) Production: $\pm 1\,\sigma_{world}$

	$\dfrac{B_s}{MC}$ Data	MC	$\dfrac{Baryon}{MC}$ Data	MC
1-D	$\pm.003$	$\pm.003$	$\pm.001$	$\pm.002$
2-D Δm	$\pm.002$	$\pm.001$	$\pm.002$	$\pm.003$
RSF	$\pm.005$	$\pm.004$	$\pm.005$	$\pm.002$

2) Baryon RSF: $\pm.05$ (nominal $= .60$)

	Data	MC
1-D	$\pm.013$	$\pm.008$
2-D Δm	$\pm.009$	$\pm.065$
RSF	$\pm.010$	$\pm.003$

* Biggest effect so far.

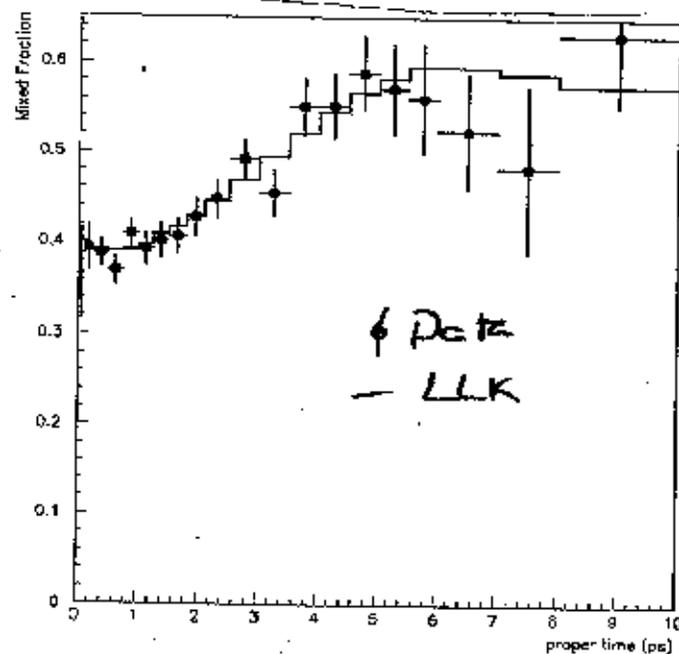2001/02/20 12.37

MC
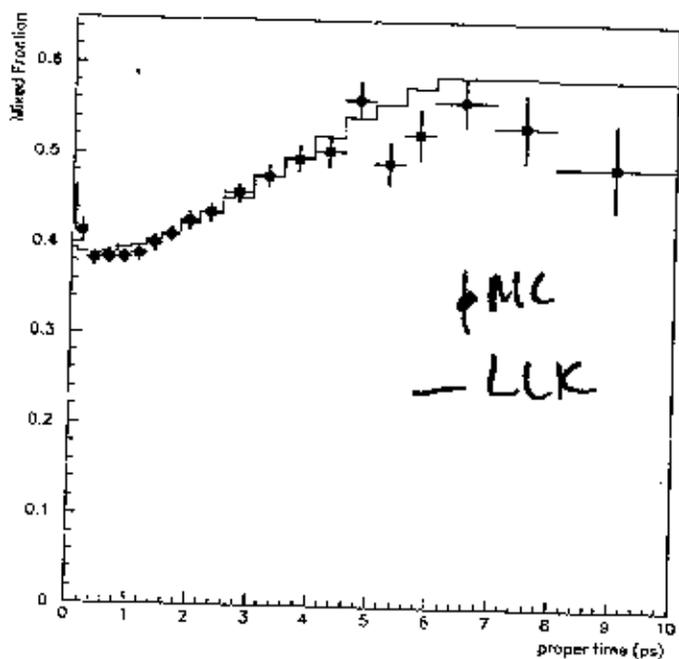
Scan $.4975 \pm .0175$

1-D $.497 \pm .017$

2-D $.500 \pm .017$

RSF $.803 \pm .010$

$$\chi^2/ndf = 31.94/18$$

Data

Scan $.5625 \pm .032$

1-D $.563 \pm .037$

2-D $.570 \pm .035$
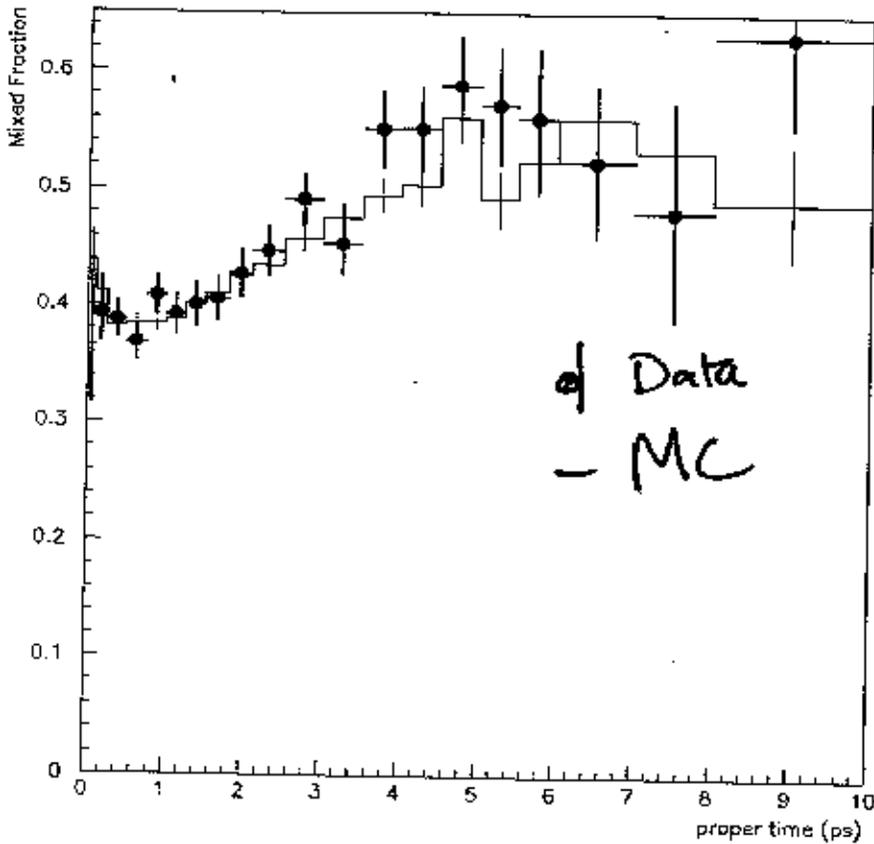
RSF $.819 \pm .023$

$$\chi^2/ndf \quad 11.71/18$$

JLW - 11

2001/02/20 12.05

Mixed Fraction vs *proper time (ps)*

● Data

— MC

Little Data Sets:

	1-D Δm	2-D Δm	2-D RSF
96	.465 ± .073	.467 ± .094	.806 ± .068
97	.541 ± .065	.537 ± .070	.785 ± .045
W98	.596 ± .068	.606 ± .067	.848 ± .048
pt SW 98	.612 ± .058	.676 ± .068	.842 ± .037