

$\tau\tau \rightarrow e\mu 4\nu$ in exp.5

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- purpose

Data $\leftrightarrow$ MC

for my physics analysis

- Data

exp.5 on resonance ($L=230/\text{pb}$)

reprocessed by b19991221

- MC sample

τ pair, 2photon($ee\mu\mu$) generic

τ pair: 1M , $ee\mu\mu$: 3M events

generated by b19990903 + evtcls of b19991221

- pre-selection and skimming

required that evtcls flag = 20

of good track (evtcls criteria) is 2.

Data: 308,237 events

MC τ pair: 378,941 $ee\mu\mu$: 27,304

- selection criteria

- cut-1 # of charged track = 2
 Net charge = 0
 # of gamma = 0
- cut-2 $\Sigma P_{cm} < 9 \text{ GeV/c}$
 $P_{cm} < 5 \text{ GeV/c}$
 $-0.95 < \cos(\theta_{P_{miss}}) < 0.985$
- cut-3 $-0.60 < \cos(\theta_{Plab}) < 0.83$ (barrel)
 $\mu: P_{lab} > 1.2 \text{ GeV/c}$, $\mu 2.\text{flag} \geq 2$
 $e: P_{lab} > 0.5 \text{ GeV/c}$, $\text{eid.prob} > 0.9$

select the event type of $e^+\mu^-$ or μ^+e^-

→ fig.

(Histograms of MC expectation are
 normalized by integrated luminosity)

- result

- yield

	data	MC expectation	data/MC
$e^+\mu^-$:	950	1086	87.5%
μ^+e^- :	1004	1120	89.6%

Data yield is smaller than MC expectation
 especially in low momentum region. ($P < \sim 2 \text{ GeV/c}$)

→ L1 trigger effect ???

- test of T/CP invariance

- triple momentum correlation

$$A = \mathbf{p}_{\text{beam}} (\mathbf{p}_l^+ \times \mathbf{p}_l^-)$$

$\mathbf{p}$: unit vector of beam/ l^+/l^- momentum

- $R = 1 + 4\delta$ (δ denotes T/CP violation portion)

$$= \frac{N(\mu^+e^-; A>0)}{N(\mu^+e^-; A<0)} \frac{N(e^+\mu^-; A>0)}{N(e^+\mu^-; A<0)}$$

→ fig.

- result

- yield

		A>0	A<0
$e^+\mu^-$:	950	500	450
μ^+e^- :	1004	515	489

$$R = 1.17 \pm 0.11(\text{stat.})$$

- Plan

search for the reason of the loss in low P region

L1 trigger by trigger bit

tracking

PID efficiency

(L4)