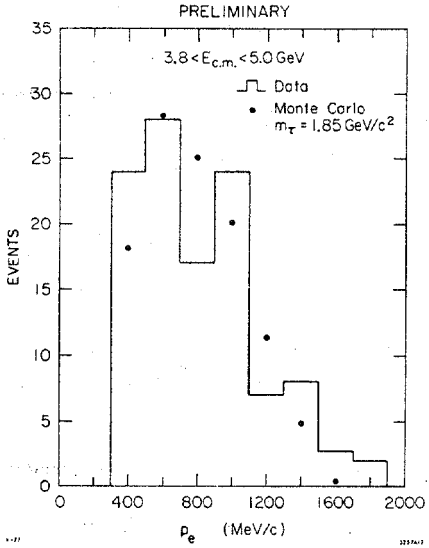

Fig. 9 Preliminary data from the DELCO Group[30] on the electron spectrum for ex events, compared to a theoretical Monte Carlo calculation for the 3-body leptonic decay of a mass 1.85 GeV/c^2 τ.

<u>e^+e^- and $\mu^+\mu^-$ pairs in SLAC-LBL magnetic detector data[31]</u>—e^+e^- and $\mu^+\mu^-$ pairs were selected requiring $p_e > 0.65$ GeV/c, $p_\mu > 0.65$ GeV/c and $\theta_{copl} > 20^o$. After corrections (which are large) for QED processes and for hadronic backgrounds, the following ratios of number of events is found.

$$\frac{\text{Number } ee}{\text{Number } e\mu} = 0.52 \pm .10 \pm {}^{.16}_{.19}$$
$$\frac{\text{Number } \mu\mu}{\text{Number } e\mu} = 0.63 \pm .10 \pm .19 \qquad (15)$$

Here the first error is one standard deviation in the statistical error; and the second error is the limits on the systematic errors added in quadrature.

<u>$\mu^+\mu^-$ pairs in Colorado-Pennsylvania-Wisconsin "Iron Ball" experiment at SPEAR[32,28]</u>—Using $p_\mu > 1.2$ GeV/c and $\theta_{copl} > 10^o$ this experiment finds 25 $\mu^+\mu^-$ events. The expected background from QED processes and hadronic contamination is 14 events, leaving 11 anomalous $\mu^+\mu^-$ events. The authors report[32] that this number is consistent with that expected from the τ.

VIII. WHY THESE ANOMALOUS TWO-CHARGED PRONG EVENTS ARE NOT FROM CHARMED PARTICLE DECAYS

There are two reasons why there is a natural tendency to try to explain these anomalous two-prong events as due to the semileptonic decays of a pair of charmed particles. First the $e\mu$ events were found just as the hunt for singly charmed mesons began. Second as shown in Section IX.A the τ mass lies within 100 MeV/c^2 of the D meson masses. Nevertheless it has been shown repeatedly that almost all of $e\mu$ events and most of the ex and μx events require a <u>non</u>-charm explanation. The best way to see why this is so is to read the papers of each experimental group to see why they each came to this conclusion using their own data. Here I will summarize the reasons for this conclusion.

A. <u>Summary of Why Anomalous Two-Prong Events are not From Charm</u>

i. Very few or no $\geq$ three-charged prong $e^\pm\mu^\mp$ events have been found compared to the number of two-charged prong, 0 photons $e^\pm\mu^\mp$ events.[15,17,19] Since charm will produce more $\geq$ three-charged prong $e\mu$ events than two-charged prong $e\mu$ events, particularly at high $E_{c.m.}$ energy, the two-charged prong, 0 photon, $e\mu$ events cannot come from charm.