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E Martin - B Purity of Lepton sample

Elizabeth presented the results of her work on the flavour composition of the lepton sample. Using a combination of lifetime and event-shape tags she obtained 3 independent sets of lepton events, enriched in b, c and uds respectively. From these she has resolved the flavour composition of the full lepton sample, which she then compared to the Monte Carlo predictions.

The shape of the P_T spectrum is well reproduced, and there is good agreement between data and Monte Carlo on the fraction of leptons from b events. However, for the number of leptons from uds events with $P_T > 1.25$GeV, the ratio between data and Monte Carlo is 1.69 ± 0.2. This discrepancy cannot be completely accounted for by assuming a bias in the lifetime tagging of lepton events that is not reproduced in the Monte Carlo.

Using the total number of lepton events as a constraint, Elizabeth calculated the b-purity of the sample, obtaining a value of $85.4 \pm 0.9\%$ for a P_T cut of 1.25GeV.

M Schmitt - Ongoing Studies In Lepton ID

Michael presented his work on the Monte Carlo simulation of b events. Using events that pass a lifetime tag, he looked at the P_T spectrum of charged tracks, GAMPEX photons and K^0_S. He found that the charged tracks spectrum was good to 10%. For Gampex photons, examined in order to check the Monte Carlo simulation of conversions, there was a discrepancy between Monte Carlo and data at low P_T. However, the lack of an energy cut on the photon means that this would not necessarily affect electron ID. The K^0_S spectrum showed a possible 25% discrepancy at low P_T.

Secondly, he reviewed his method of deriving the P_T spectrum of fake leptons. He has selected hemispheres containing 2 leptons with the same sign and formed a histogram from the P_T values of both. Subtracting the P_T spectrum for single leptons should then give the spectrum for fake leptons (on the assumption that the second lepton must be fake). The distribution derived from the Monte Carlo using this technique compared well with the distribution taken from the Monte Carlo truth.

Next, he discussed the estimators for electron ID. Using $e^{\pm}$ from photon conversions, he applied standard cuts to one of the pair, then measured the estimators for the other as a function of time and detector position. He found that the variations were not the same in the data and Monte Carlo, causing a systematic error for identification efficiencies. To resolve this, Michael applied a series of ad hoc corrections, removing the variations.

The R_5 estimator was found to vary strongly with P_T. Michael has investigated this variation as a function of separation from the nearest track, using electrons and muons.

The primary effect is found to be due to tracks close in z, resulting in overlapping pulses. Empirical corrections as a function of $| \delta \tan \lambda |$ and $| \delta \phi |$ were calculated using the muons, resulting in a reduced P_T dependence.

Finally, Michael introduced a new variable for use in electron ID. He takes the cumulative probability distributions for R_T, R_L and R_5, and multiplies them to give a variable $G = C_T C_L C_5$. The new electron ID variable, η, is then defined as the cumulative probability of G. The distribution of η is flat between 0 and 1 for the data, and sharply peaked at 0 for the background. Using this distribution and working with b events, he can obtain a sample of electrons with high purity and efficiency (e.g. 90% efficiency gives about 93% purity).

P Perret - New Measurements With Single Leptons

Pascal showed a derivation of R_b and $Br(c \to l)$ using single leptons. Using QIPBTAG to give the (P, P_T) spectrum of leptons from b's and DELCO data for those from c's, he fitted to the respective normalizations to obtain $R_b = 22.07 \pm 0.41 \pm 0.22$ and $Br(c \to l) = 9.28 \pm 0.73 \pm 0.31$.

He then presented a measurement of the b-purity of the single lepton sample. Using the LEP average for R_b and a b sample selected with QIPBTAG Pascal obtained the b-purities $92.97 \pm 1.0 \pm 0.9\%$ for electrons, $89.54 \pm 0.9 \pm 0.8\%$ for muons and $90.90 \pm 0.9 \pm 0.8\%$ for both. The first error quoted is due to the lifetime tag, the second to R_b.

Finally, he gave an update on the lepton b-tag analysis. The method uses a QIPBTAG cut on the hemisphere opposite the lepton. The result for the b-purity of the lepton sample is $89.1 \pm 2.2 \pm 0.9\%$. He then gave the results of his fit to the data in P_T for the selected lepton sample. The branching ratios $Br(b \to l)$ and $Br(b \to c \to l)$ and the fragmentation parameter $< X_b >$ were obtained from the fit.

D Abbaneo - Measurement of $Br(b \to l$ and $Br(b \to c \to l)$

Duccio gave a status report on his analysis. He selects b events with a QIPBTAG cut on one hemisphere, then studies lepton yields in the other. Two samples are extracted, one where this second hemisphere contains a single lepton and one where it contains two of opposite charge. A binned likelihood fit to the P_T spectra of the two samples was used to give the branching ratios $Br(b \to l) = 11.08 \pm 0.10 \pm 0.29$ and $Br(b \to c \to l) = 7.75 \pm 0.19 \pm 0.56$. The QIPBTAG acceptance and R_b are calculated using Dave Brown's method; the Monte Carlo used in the calculations of the likelihood was corrected to reproduce decay spectra from DELCO and CLEO.

The P_T spectra of the leptons agrees well between data and Monte Carlo but there is a worrying difference between the acceptance for 1992 ($\epsilon_b = 0.350$) and 1993 ($\epsilon_b = 0.339$), whilst the acceptance for charm has remained constant. Differences are also found for the branching ratios for the 1993 data, depending whether 1992 Monte Carlo, weighted to allow for detector changes, or 1993 Monte Carlo is used.