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Recorded by A M Greene

1 From $A_{\rm FB}(b\bar{b})$ to $\sin^2\theta_W(m_Z^2)$ - M Martinez

Manel described the two main reasons for measuring $A_{\rm FB}(b\bar{b})$: it is the most accurate electroweak measurement possible from hadronic data and it gives an upper limit on m_H. He showed how combining a measurement of $A_{\rm FB}(b\bar{b})$ with other measurements helps to constrain m_t and m_H, using plots shown at Moriond in 1991 and the Geneva conference.

He then went on to explain how an observed asymmetry can be related to $A_{\rm FB}{}^0(b\bar{b})$, the asymmetry corrected for the spread of centre of mass energies and initial and final state QED and QCD corrections. He showed how an effective $\sin^2\theta_W$ could be extracted and gave the value

$$A_{\rm FB}{}^0(b\bar{b}) = 0.104 \pm 0.016$$

which he had obtained from combined LEP results presented at La Thuile.

He discussed QCD corrections and how they depend on the cuts used. He gave a conservative estimate of the effect of these corrections as $\delta_{\rm QCD} \simeq (-3 \pm 1)\%$ but emphasised the need for a detailed analysis of the experimental set up.

He proposed $A_{\rm FB}{}^0(b\bar{b})$ as a common notation and gave a precise definition. He showed that this number was equivalent to $\sin^2\theta_W(m_Z^2)$ in constraining m_t and m_H.

Various questions were raised about what would be presented at the Dallas conference. A new ALEPH value of $A_{\rm FB}(b\bar{b})$ would perhaps not be ready until the end of September. It was pointed out that in any case at the conference a theorist would be presenting values from fits to combined LEP results, including $A_{\rm FB}(b\bar{b})$.

2 p_T dependence of the mixing parameter χ - F Prulhiere

Frederic gave a brief explanation of how χ can be measured from a fit in the $(p_{T\rm min}, p_\otimes)$ plane and gave two results obtained using the 1991 data. The first,

$$\chi = \left(13.28^{+1.75}_{-1.63} \pm 0.52\right)\%,$$

was obtained with no p_T cut and the second,

$$\chi = \left(12.36^{+2.13}_{-1.95} \pm 0.27\right)\%,$$

was obtained with the cut $p_T \geq 0.8\,{\rm GeV}/c$. He explained how the the fractions f_d and f_s in the expression $\chi = f_d\chi_d + f_s\chi_s$ are different for $b \to l$ and $b \to c \to l$ and hence depend on p_T.

He estimated the effect of assuming no p_T dependence in a measurement of χ and concluded that a measurement of $A_{\rm FB}(b\bar{b})$ at high p_T needs χ to be measured at high p_T. There was no cause for alarm with $p_T \geq 0.8\,{\rm GeV}/c$ but he suggested that some kind of combined fit might be better.

3 A measurement of the B_s^0 lifetime - V Sharma

Vivek reported on a measurement of the B_s^0 lifetime on which he had been working along with Xidong Wu, Min Zheng and Fred Weber. He reminded us of the work done previously on the branching ratio $\mathrm{Br}(b \to \overline{B}_s^0 \to D_s^+ X l^- \overline{\nu})$ and discussed the relative merits in a lifetime measurement of using the vertex detector with $\frac{1}{3}$ the statistics and not using the vertex detector with the full statistics. They had decided to use the vertex detector. He described the cuts used to select opposite sign and same hemisphere D_s and l and the techniques used to extract the proper B_s^0 decay time from the decay length. He listed the systematic errors they had considered and gave the result

$$\tau_{B_s} = 1.05 \pm 0.37 \pm 0.09\,\mathrm{ps}.$$

It was decided to give this result to a rapporteur at the Dallas conference.

4 Search for the decay $B \to K^*\gamma$ - A Kyriakis

Aristoteles described how $B \to K^*\gamma$ can happen in the Standard Model via 'penguin' diagrams and explained the theoretical interest in the decay. He gave the limits set by ARGUS and CLEO.

He then reviewed some earlier work on the channel $B^\pm \to K^{*\pm}(892)\gamma \to K_S^0\pi^\pm$ with the result

$$\mathrm{Br}\left(B^\pm \to K^{*\pm}(892)\gamma\right) < 8.2 \times 10^{-3}\ (90\%\,\mathrm{c.l.})$$

using both the 1990 and 1991 data.

He described new work searching in the channel $B^0 \to K^{*0}(892)\gamma \to K^+\pi^-$ with the result

$$\mathrm{Br}\left(B^0 \to K^{*0}(892)\gamma\right) < 1.7 \times 10^{-3}\ (90\%\,\mathrm{c.l.})$$

It was pointed out that the measurement was not competitive with the ARGUS and CLEO results. However, this was not considered grounds for abandoning the analysis in view of the different energies involved.

5 Neutrino measurement in D^*-l correlations - H Duarte

Helder reported on work to reconstruct neutrinos from $B^0 \to D^{*+} l^- \overline{\nu}$ with a view to measuring the B_s^0 mass from $B_s^0 \to D_s^+ l^- \overline{\nu}$. He talked about the various contributions to the calorimetric energy as produced by the Janot energy flow algorithm and showed how well the neutrino energy could be reconstructed. He described how the neutrino energy could be assigned a direction and showed a mass distribution for $D^* l\nu$ where the D^* and l were in the same hemisphere as defined by the thrust axis and were of opposite charge. The distribution was encouragingly peaked around 5 GeV/c^2, but the conclusion was that the neutrino reconstruction algorithm was in need of improvement.

6 AOB

The next meeting was scheduled for 16 September 1992.