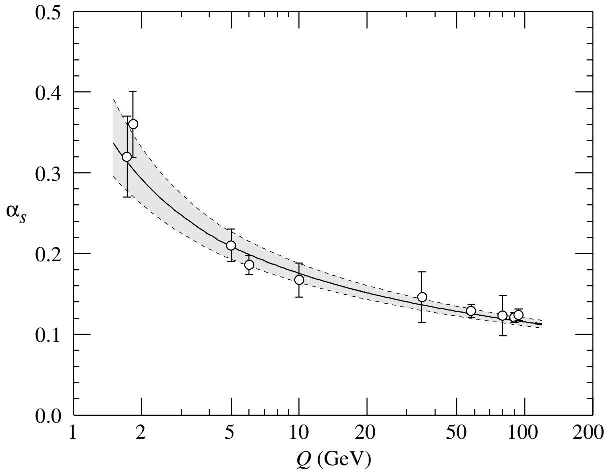

Figure 25.2: Summary of the values of $\alpha_s(Q)$ at the values of Q where they are measured. The lines show the central values and the $\pm 1\sigma$ limits of our average. The figure clearly shows the decrease in $\alpha_s(Q)$ with increasing Q.

QCD. Emphasis has been given to the recent data from LEP and deep-inelastic scattering. Figure 25.1 shows the values of $\alpha_s(M_Z)$ deduced from the various experiments. Figure 25.2 shows the values and the values of Q where they are measured. This figure clearly shows the experimental evidence for the variation of $\alpha_s(Q)$ with Q.

An average of the values in Fig. 25.1 gives $\alpha_s(M_z) = 0.117$ with a total χ^2 of 5.9 for nine fitted points. The error on the average assuming that all of the errors in the contributing results are uncorrelated is ± 0.0023 and is surely an underestimate. Since, in most cases the dominant error is systematic (mainly theoretical), a more reasonable estimate is to use the smallest of the individual errors on the experimental results *i.e.* ± 0.005. Our value is then $\alpha_s(M_z) = 0.117 \pm 0.005$ which corresponds to $\Lambda^{(5)} = 195 + 65 - 50$ MeV.

The prospects for improvement in the error are controlled mainly by the potential improvements in the theoretical errors. Lattice calculations that do not resort to the quenched approximation offer one of the best opportunities. On the experimental side, the direct determination of the top quark mass and a smaller error on the hadronic width of the Z should result in a significantly reduced error on α_s.

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