Structure Functions

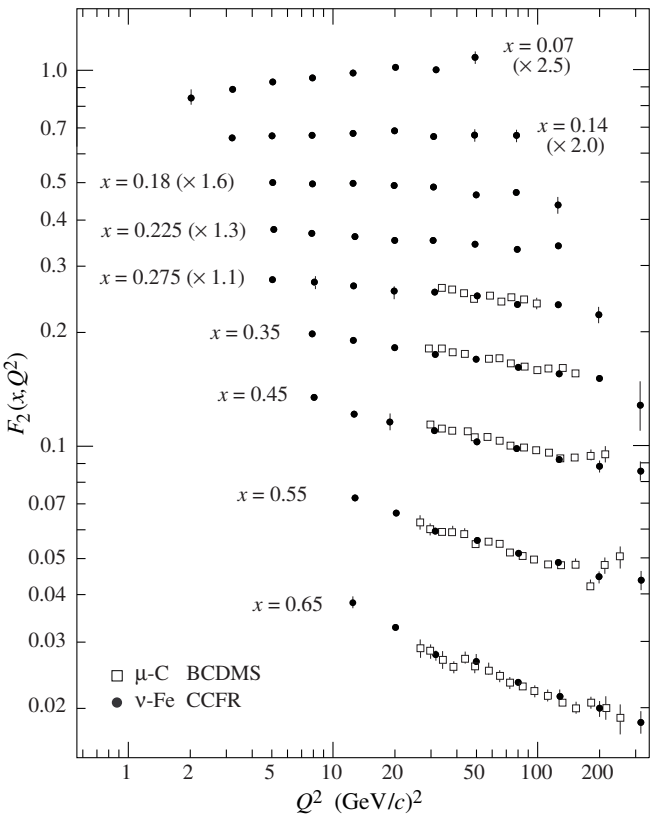

Figure 38.5: The nucleon structure function F_2 measured in deep inelastic scattering of muons on carbon (BCDMS) and neutrinos on iron (CCFR). The data are shown versus Q^2, for bins of fixed x, and have been scaled by the factors shown in parentheses. References: **BCDMS**—A.C. Benvenuti *et al.*, Phys. Lett. **B195**, 91 (1987); **CCFR**—S.R. Mishra *et al.*, NEVIS-1465 (1992). (Courtesy of R. Voss, 1996.)

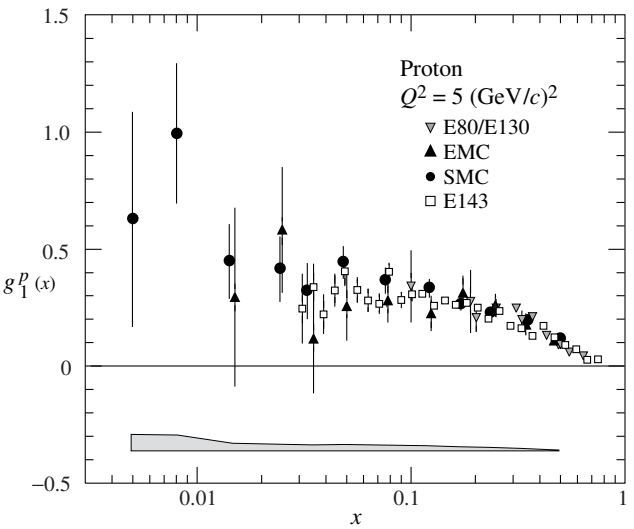

Figure 38.6: The spin-dependent structure function $g_1(x)$ of the proton measured in deep inelastic scattering of polarized electrons (E80, E130, E143) and muons (EMC, SMC), shown at $Q^2 = 5\ GeV^2$. Only statistical errors are shown with the data points. As an example, the SMC systematic error is indicated by the shaded area. References: **E80**—M.J. Alguard *et al.*, Phys. Rev. Lett. **37**, 1261 (1976); ibid. **41**, 70 (1978); **E130**—G. Baum *et al.*, Phys. Rev. Lett. **51**, 1135 (1983); **E143**—K. Abe *et al.*, Phys. Rev. Lett. **74**, 346 (1995); **EMC**—J. Ashman *et al.*, Nucl. Phys. **B328**, 1 (1989); **SMC**—B. Adeva *et al.*, Phys. Lett. **B412**, 414 (1997). In this plot, the E80, E130 and EMC data have been reevaluated using up-to-date parametrizations of F_2^p and $R = \sigma_L/\sigma_T$. (Courtesy of R. Voss, 1997.)

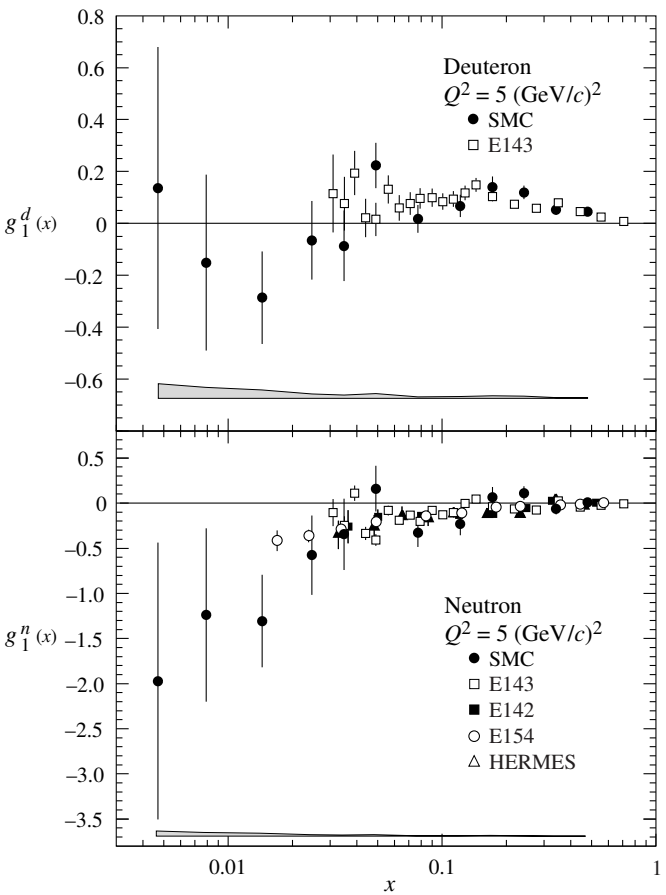

Figure 38.7: The spin-dependent structure function $g_1(x)$ of the deuteron (top) and the neutron (bottom) measured in deep inelastic scattering of polarized electrons (E142, E143, E154, HERMES) and muons (SMC). The SMC and E143 results for the neutron are evaluated from the difference of deuteron and proton data; the E142, E154, and HERMES results were obtained with polarized ^{3}He targets. Only statistical errors are shown with the data points. As an example, the SMC systematic error is indicated by the shaded area. All results except the HERMES data are shown at $Q^2 = 5\ GeV^2$; the HERMES results are shown at the average Q^2 of the respective data point which varies from $Q^2 = 1.22\ GeV^2$ at $x = 0.033$ to $Q^2 = 5.25\ GeV^2$ at $x = 0.464$. References: **E142**—P.L. Anthony *et al.*, Phys. Rev. Lett. **71**, 959 (1993); **E143**–K. Abe *et al.*, Phys. Rev. Lett. **75**, 25 (1995); **E154**—K. Abe *et al.*, Phys. Lett. **B405**, 180 (1997) and hep-ph/9705344 v2 (1997); **HERMES**—K. Ackerstaff *et al.*, Phys. Lett. **B404**, 383 (1997); **SMC**—D. Adams *et al.*, Phys. Lett. **B396**, 338 (1997). (Courtesy of R. Voss, 1997.)