1 DIS contribution to $\Gamma_1(Q^2)$

The Regge based global fit of Bianchi and Thomas [1] provides an estimate for the unmeasured contribution to $\Gamma_1^p(Q^2) = \int_0^1 g_1(x,Q^2)dx$. This fit relies on 9 parameters, each of which has an associated error. In order to propogate these errors through to the integral, we consider the DIS integral as a parameter-dependent function f:

$$f(Q^2 : p_1, p_2, \ldots, p_i, \ldots, p_N) = \int g_1(x, Q^2 : p_1, p_2, \ldots, p_i, \ldots, p_N)dx \qquad (1)$$

Neglecting any possible correlations between the fit parameters, we observe:

$$\Delta f^2 = \sum_{i=1}^{N} \left(\frac{\partial f}{\partial p_i}\right)^2 \Delta p_i^2$$

where Δp_i is the quoted error [1] for the i^{th} parameter. In lieu of an analytic expression for the derivatives called for in eq. 2, we utilize the numerical approximation:

$$\left(\frac{\partial f}{\partial p_i}\right) \approx \frac{f(Q^2 : p_1, \ldots, p_i + \delta p_i, \ldots, p_N) - f(Q^2 : p_1, \ldots, p_i - \delta p_i, \ldots, p_N)}{2\delta p_i} \qquad (2)$$

Here, δp_i is a small differential in the parameter p_i, which we take as $0.1\Delta p_i$. The specific value 0.1 is quite arbitrary and the results are only very weakly dependent on it. With these assumptions, we find:

$$\begin{aligned} \Gamma_1^{DIS}(Q^2 = 1.279) &= \int_{0.0025}^{0.3025} g_1^{DIS}(x)dx \\ &= 0.0657 \pm 0.0096 \text{ (proton)} \\ &= -0.0278 \pm 0.0095 \text{ (neutron)} \end{aligned}$$

References

[1] E. Thomas and N. Bianchi, "First Regge paramerisation of polarized DIS cross section", Nucl.Phys.Proc.Suppl.**82**, 256 (2000). Model II used here.

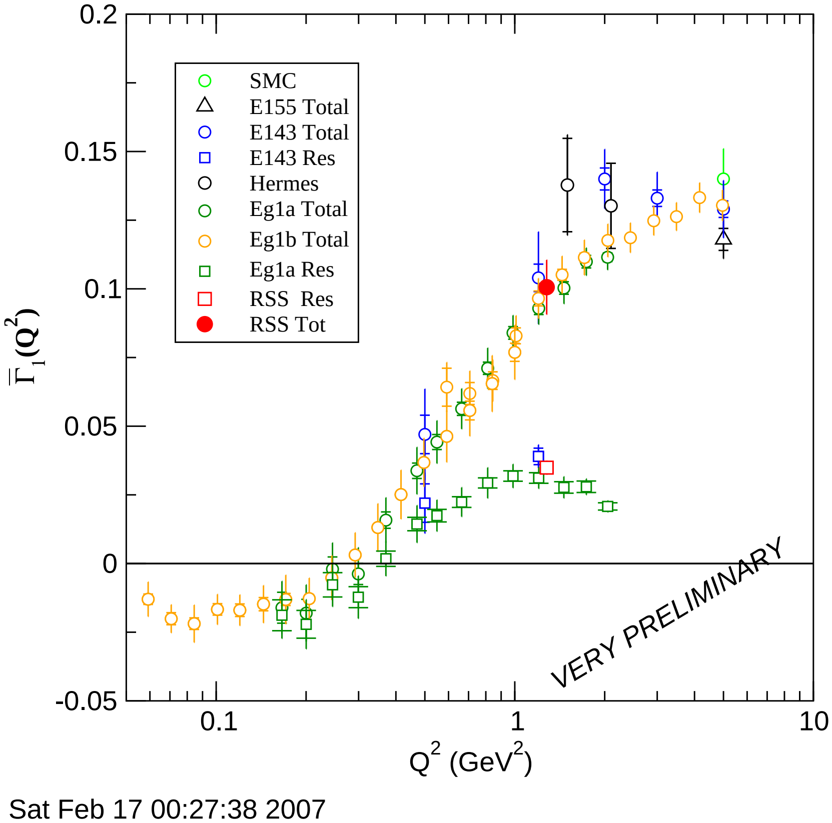

Figure 1: $\Gamma_1^p(Q^2 = 1.279)$ with DIS contribution from Ref. [1].