The expression on the right hand side can in turn be bounded from below if we shrink the range of integration. In particular, let us, say, double the lower limit on the x integral, so that $(1-y)^2 > 1/4$. Moreover, let us replace the upper limit on the q^2 integral by $2m\mathcal{E}/(\ln \mathcal{E}/m)^{\gamma}$, where γ is some positive parameter. Next observe that

$$\int_{q^2/m\mathcal{E}}^{1} \frac{dx}{x} F_2 > \int_{q^2/m\mathcal{E}}^{1} \frac{dx}{x^{\alpha}} F_2$$

$$> \int_0^1 \frac{dx}{x^{\alpha}} F_2 - \left(\frac{q^2}{m\mathcal{E}}\right)^{\beta} \int_0^1 \frac{dx}{x^{\alpha+\beta}} F_2 , \tag{12}$$

where $\alpha > 0$, $\beta > 0$ and $\alpha + \beta < n_0$. We now invoke the bound in Eq. (8) and require, in the notation of Eq. (9), that

$$f(\alpha+\beta) - f(\alpha) < \gamma\beta . \tag{13}$$

Then it readily follows that

$$\sigma/\mathcal{E} > C(\alpha) / \left[\ln(\mathcal{E}/m)\right]^{\gamma - f(\alpha)}, \tag{14}$$

where $C(\alpha)$ depends on the parameter α but not on the energy $\mathcal{E}$.