process from high-x antiquarks in the antiproton annihilating with quarks in the proton.

## V. PRESENT-DAY PARAMETRIZATIONS OF THE PDFS

Excellent reviews of the parametrization of distribution functions exist. In fact, a good starting point for most of the distribution functions can be found at the Durham website (http://durpdg.dur.ac.uk/HEPDATA/PDF). At this website, one can access compilations of data, codes and grids associated with the following distribution functions: MRST/MSTW – Sec. V.A; CTEQ – Sec. V.B; GRV/GJR – Sec. V.C; and ALEKHIN – Sec. V.D, as well as an online PDF calculator. Here we consider primarily the CTEQ, MRST and the GRV parametrizations, emphasizing the differences between them. Another very useful website is that of CTEQ (http://www.phys.psu.edu/~cteq/). Here the CTEQ QCD handbook (Brock *et al.*, 1995) can readily be accessed. The recent status of the MRST/MSTW PDFs can be found in (Thorne *et al.*, 2009), wherein the MSTW2008 distribution functions (Martin *et al.*, 2009) are recommended.

The primary source of variations between the parametrizations are the different:

- data sets used in the fits;
- selections of data within the data sets;
- pQCD choices – e.g., evolution order, factorization scheme, renormalization scale, $\alpha_s$;
- parametric forms for the PDF;
- theoretical assumptions about the $x \to 1$ behavior.

Although there are also distinct treatments of heavy flavors, assumptions of sea flavor asymmetry and $x \to 0$ behavior, these do not have a large impact on the valence region.

Most parametrizations begin with valence-like input, which means that at some infrared scale $Q_0 \lesssim 1\ GeV$ all distribution functions are represented as

$$xf(x, Q_0^2) \sim x^{\alpha_f}(1-x)^{\beta_f}, \tag{V.1}$$

where $\alpha_f > 0$ and $\beta_f > 0$ are fit parameters, so that even those of the sea and glue distributions are nonzero but finite at the infrared boundary. Then, typically, the distribution