$\Delta^+ = -2\xi P^+$; $\tilde{F}^{\alpha\beta} \equiv \frac{1}{2}\epsilon^{\alpha\beta\gamma\delta}F_{\gamma\delta}$ is the dual gluon field strength. Throughout this paper we adopt the light-cone gauge $A^+ = 0$, so that the gauge link does not appear in the operators in definitions (2), (3).

The definition (2) differs from other definitions encountered in the literature (see [4]). For $0 \le x \le 1$:

$$H^g(x,\xi,t)|_{\rm here} = H^g(x,\xi,t)|_{[3]} + H^g(-x,\xi,t)|_{[3]} = x\left(H^g(x,\xi,t)|_{[17]} - H^g(-x,\xi,t)|_{[17]}\right).$$
$$\tilde{H}^g(x,\xi,t)|_{\rm here} = \tilde{H}^g(x,\xi,t)|_{[3]} - \tilde{H}^g(-x,\xi,t)|_{[3]} = x\left(\tilde{H}^g(x,\xi,t)|_{[17]} + \tilde{H}^g(-x,\xi,t)|_{[17]}\right).$$

The same relations hold for E^g and $\tilde{E}^g$ respectively.

As the gluon itself is its own antiparticle gluon GPDs $H^g(x,\xi,t)$, $E^g(x,\xi,t)$ defined in (2) are even functions of x:

$$H^g(x,\xi,t) = H^g(-x,\xi,t)\,; \quad E^g(x,\xi,t) = E^g(-x,\xi,t)\,. \tag{4}$$

Gluon GPDs $\tilde{H}^g(x,\xi,t)$, $\tilde{E}^g(x,\xi,t)$ defined in (3) are odd functions of x:

$$\tilde{H}^g(x,\xi,t) = -\tilde{H}^g(-x,\xi,t)\,; \quad \tilde{E}^g(x,\xi,t) = -\tilde{E}^g(-x,\xi,t)\,. \tag{5}$$

Let us stress that in what follows we consider the gluon GPDs in nucleon (2), (3) on the interval $0 \le x \le 1$.

In the froward limit gluon GPDs H^g and $\tilde{H}^g$ reduce to usual forward gluon distributions in the nucleon $g(x)$ and $\Delta g(x)$, while GPD E^g and $\tilde{E}^g$ are reduced to unknown gluon distributions, which we denote as $e^g(x)$ and $\Delta e^g(x)$:

$$\begin{aligned} &H^g(x,0,0) = xg(x); \quad E^g(x,0,0) = xe^g(x)\,; \\ &\tilde{H}^g(x,0,0) = x\Delta g(x); \quad \tilde{E}^g(x,0,0) = x\Delta e^g(x)\,. \end{aligned} \tag{6}$$

Note that the forward gluon distributions $g(x)$, $\Delta g(x)$ and $e^g(x)$, $\Delta e^g(x)$ are continued to the negative value of their argument according to:

$$\begin{aligned} &g(x) = -g(-x)\,; \quad e^g(x) = -e^g(-x)\,; \\ &\Delta g(x) = \Delta g(-x)\,; \quad \Delta e^g(x) = \Delta e^g(-x)\,. \end{aligned} \tag{7}$$