$$\begin{pmatrix}
p \to p \exp\left[-\frac{\tau}{2} \frac{p_{\zeta}}{m_{\zeta}}\right] \\
q \to q \exp\left[-\frac{\tau}{2} \frac{p_{\xi}}{m_{\xi}}\right] \\
\zeta \to \zeta + \frac{\tau}{2} \frac{p_{\zeta}}{m_{\zeta}} \\
\xi \to \xi + \frac{\tau}{2} \frac{p_{\xi}}{m_{\xi}}
\end{pmatrix} : U_{C}^{BK}\left(\frac{\tau}{2}\right)$$

$$\left. \begin{array}{c}
q \rightarrow q + \frac{\tau}{4} \frac{p}{m} \\
p_{\zeta} \rightarrow p_{\zeta} + \frac{\tau}{4} F_{p_{\zeta}}
\end{array} \right\} : U_{B}^{BK} \left(\frac{\tau}{4}\right)$$

$$\begin{array}{ccc}
 & p & \rightarrow & p + \tau F \\
 & p_{\xi} & \rightarrow & p_{\xi} + \tau F_{p_{\xi}}
\end{array} \right\} : U_A^{\text{BK}}(\tau)$$

$$\begin{pmatrix}
q & \rightarrow q + \frac{\tau}{4} \frac{p}{m} \\
\bullet & \eta & \rightarrow \eta + \frac{\tau}{4} \frac{p_{\eta}}{m_{\eta}} \\
p_{\zeta} & \rightarrow p_{\zeta} + \frac{\tau}{4} F_{p_{\zeta}}
\end{pmatrix} : U_{B}^{BK} \left(\frac{\tau}{4}\right)$$

$$\begin{array}{c}
p \to p \exp\left[-\frac{\tau}{2} \frac{p_{\zeta}}{m_{\zeta}}\right] \\
q \to q \exp\left[-\frac{\tau}{2} \frac{p_{\xi}}{m_{\xi}}\right] \\
\zeta \to \zeta + \frac{\tau}{2} \frac{p_{\xi}}{m_{\zeta}} \\
\xi \to \xi + \frac{\tau}{2} \frac{p_{\xi}}{m_{\xi}}
\end{array} \right\} : U_{C}^{BK} \left(\frac{\tau}{2}\right)$$

$$\left. \begin{array}{c}
q \rightarrow q + \frac{\tau}{4} \frac{p}{m} \\
p_{\zeta} \rightarrow p_{\zeta} + \frac{\tau}{4} F_{p_{\zeta}}
\end{array} \right\} : U_{B}^{\text{BK}} \left(\frac{\tau}{4}\right)$$