

$$\begin{array}{ccc}
 \bullet & U(G) \xrightarrow{\eta} U(G) & g \mapsto \eta(g) \\
 \downarrow f_{g'} & \downarrow \varphi_{g'} \qquad \downarrow \varphi_{g'} & \downarrow \qquad \qquad \downarrow \\
 \bullet & U(G) \xrightarrow{\eta} U(G) & g' \cdot g \mapsto \eta(g' \cdot g) = g' \cdot \eta(g)
 \end{array}$$