

$$\begin{array}{ccc}
((\Phi F)(X'))(Y') & \xrightarrow{\beta_{X'}(Y')} & ((\Phi G)(X'))(Y') \\
\downarrow g^* & & \downarrow g^* \\
((\Phi F)(X'))(Y) & \xrightarrow{\beta_{X'}(Y)} & ((\Phi G)(X'))(Y)
\end{array}$$