

$$\begin{array}{c}
 (\mathbf{X}_f * \mathbf{X}_g) \xrightarrow{\quad} (\mathbf{X}_f) \times (\mathbf{X}_g) \xrightarrow[\pi_2]{\quad} (\mathbf{X}_g) \xrightarrow[\mathrm{ro}_g]{\quad} \mathbf{Y}_g \\
 \mathrm{coh}_{f,g}^{-1}
 \end{array}$$