

$$\begin{array}{ccccc}
 \mathcal{C} & \xleftarrow{\pi_{\mathcal{C}}} & \mathcal{C} \times \mathcal{D} & \xrightarrow{\pi_{\mathcal{D}}} & \mathcal{D} \\
 \downarrow F & & \downarrow F \times G & & \downarrow G \\
 \mathcal{C}' & \xleftarrow{\pi_{\mathcal{C}'}} & \mathcal{C}' \times \mathcal{D}' & \xrightarrow{\pi_{\mathcal{D}'}} & \mathcal{D}'
 \end{array}$$