$$\rho@\mathbf{y}_{CU} = \rho@\mathbf{y}_{QU} = \begin{pmatrix} 0 & 0 \\ \epsilon & 0 \end{pmatrix};\ \rho@\mathbf{a}_{CU} = \rho@\mathbf{a}_{QU} = \begin{pmatrix} \gamma & 0 \\ 0 & 0 \end{pmatrix};$$

$$\rho@\mathbf{x}_{CU} = \begin{pmatrix} 0 & \gamma \\ 0 & 0 \end{pmatrix};\ \rho@\mathbf{x}_{QU} = \mathbf{SS}@\begin{pmatrix} 0 & \left(1 - e^{-\gamma\,\epsilon\,\hbar}\right) / (\epsilon\,\hbar) \\ 0 & 0 \end{pmatrix};$$

```
ρ[e^ℰ_] := MatrixExp[ρ[ℰ]];
ρ[ℰ_] :=
  (ℰ /. {t → γ ϵ, T → e^(ħ γ ϵ/2)} /.
    (U : CU | QU)[u___] :> Fold[Dot, {{1, 0}, {0, 1}}, ρ /@ U /@ {u}])
```