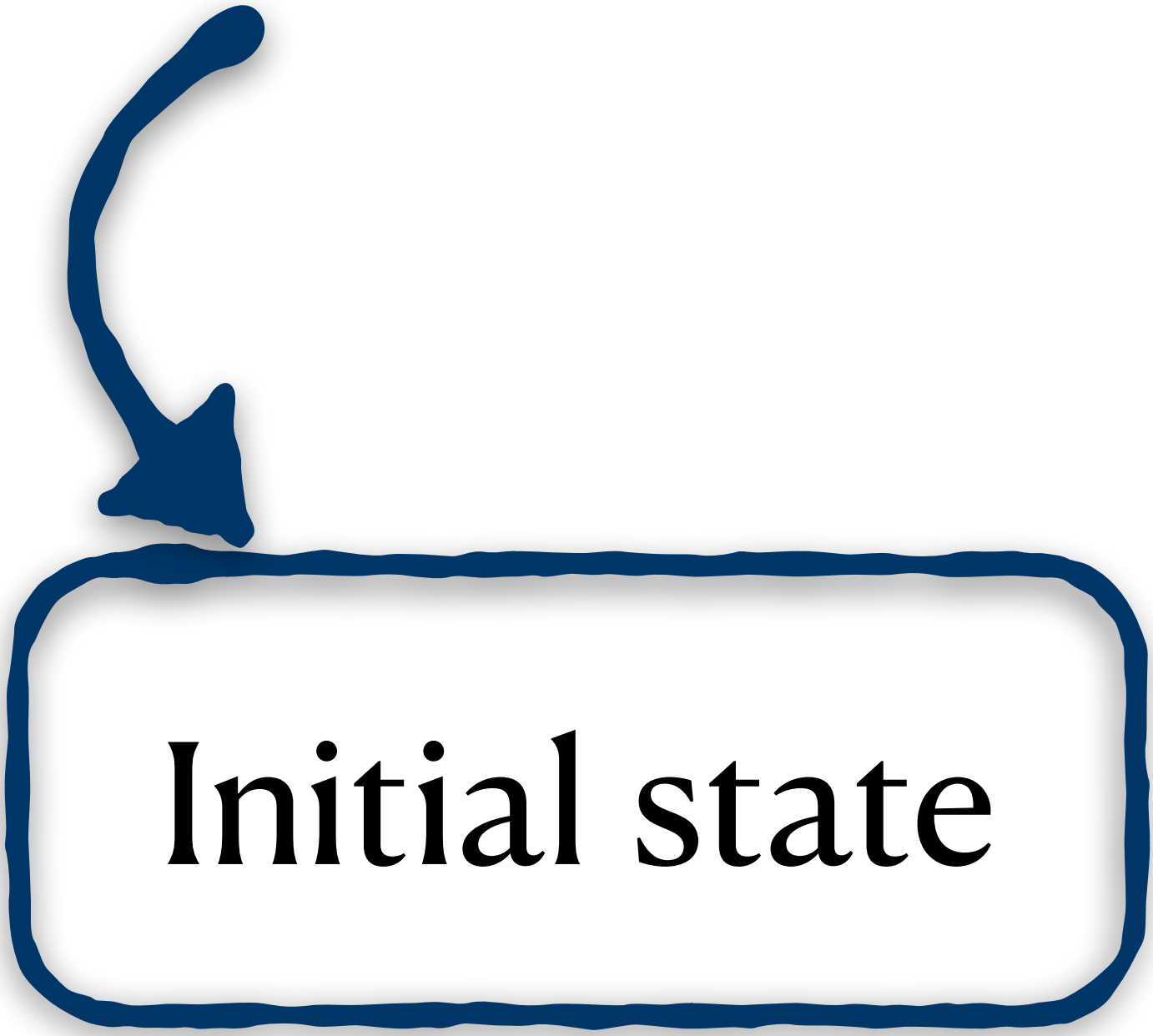
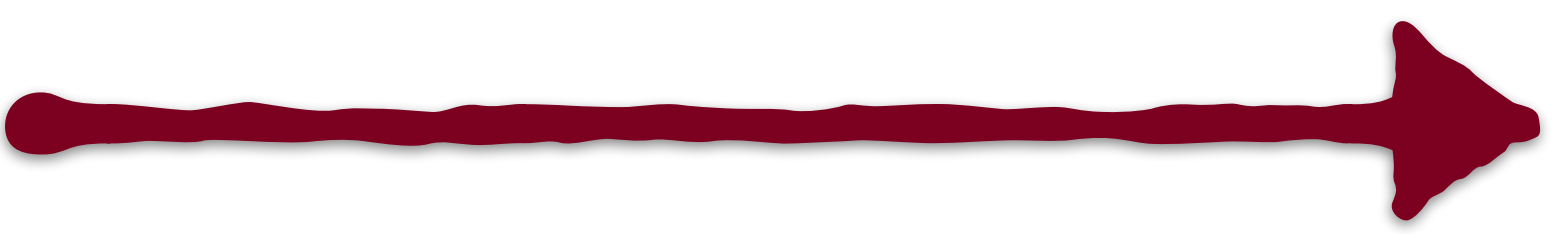
Jack Y. Araz

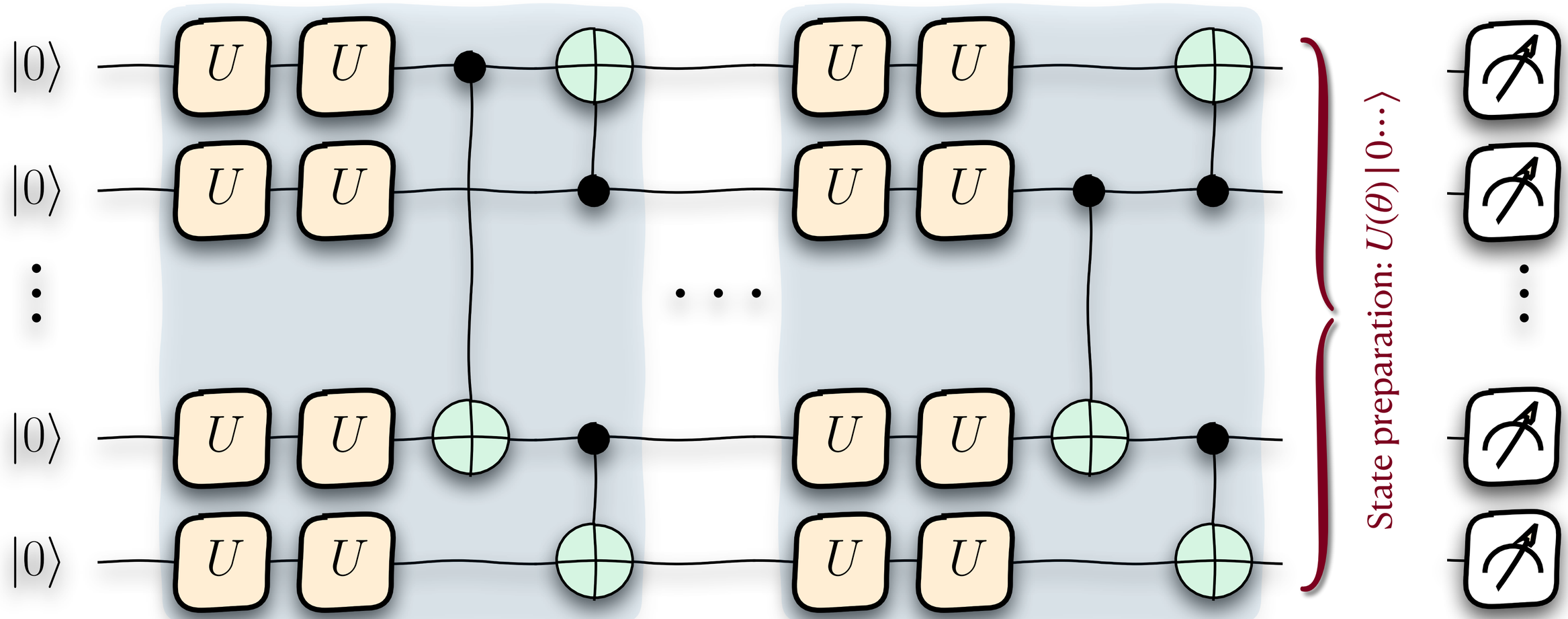
Jefferson Lab
EXPLORING THE NATURE OF MATTER

OLD DOMINION UNIVERSITY
1930


Initial state



Read from left to right!


$|0\rangle$
$|0\rangle$
$|0\rangle$
$|0\rangle$
U
State preparation: $U(\theta)|0\cdots\rangle$

Single Qubit Gates

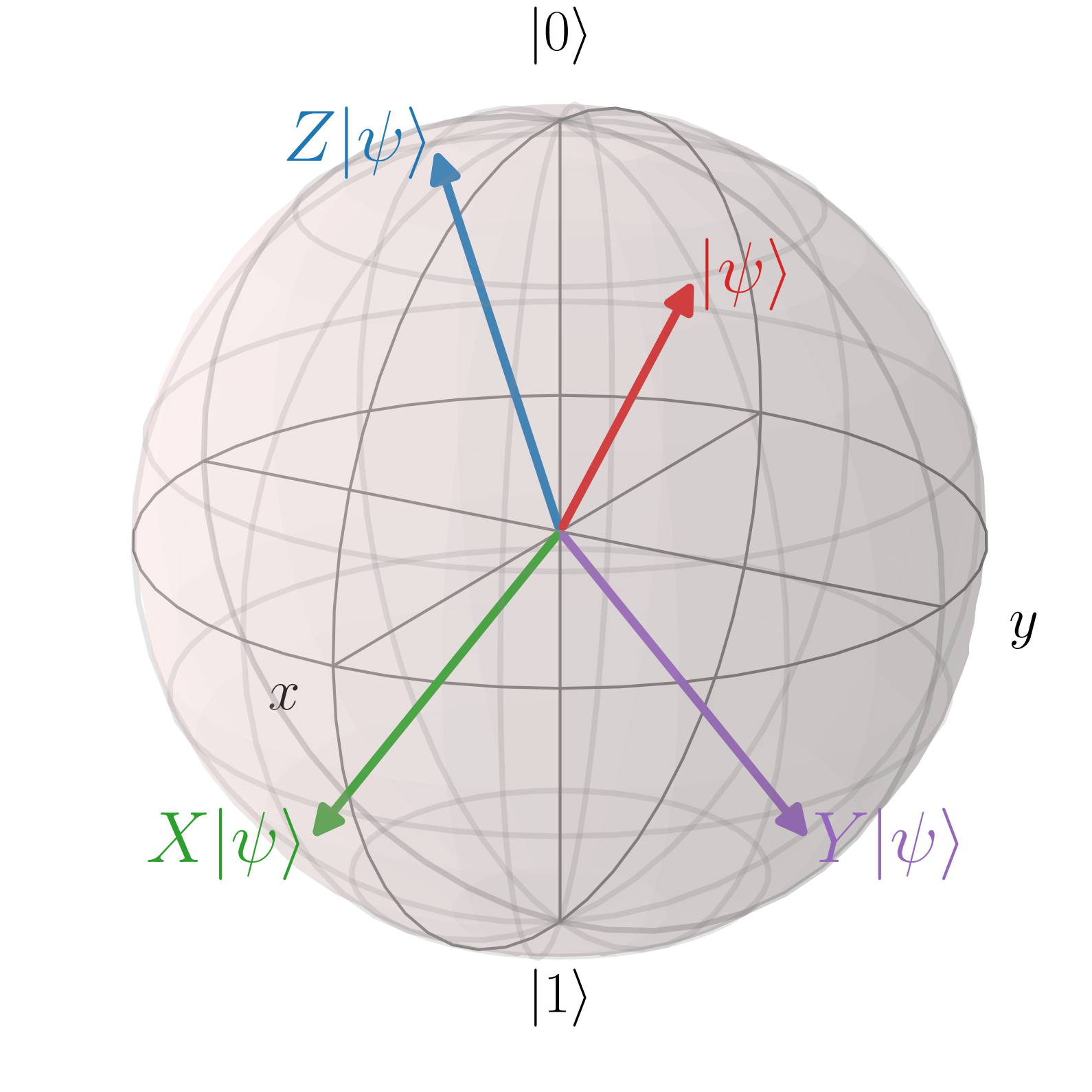
- U: operations on the Unit sphere
- Pauli matrices: $X,\ Y,\ Z,\ I$

$$\alpha|0\rangle + \beta|1\rangle$$

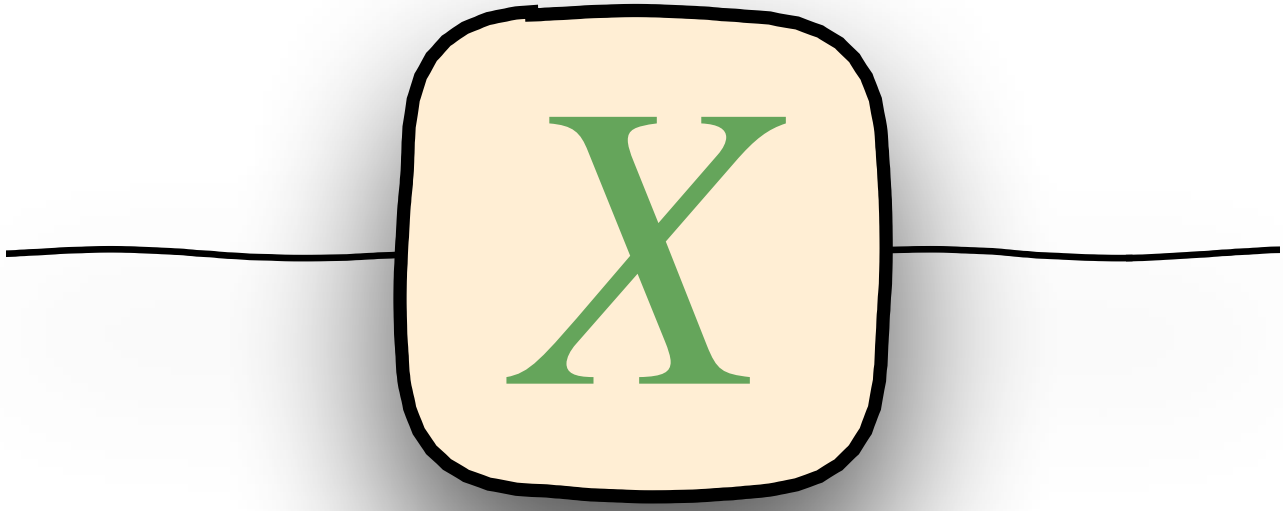
$$\alpha|1\rangle + \beta|0\rangle$$

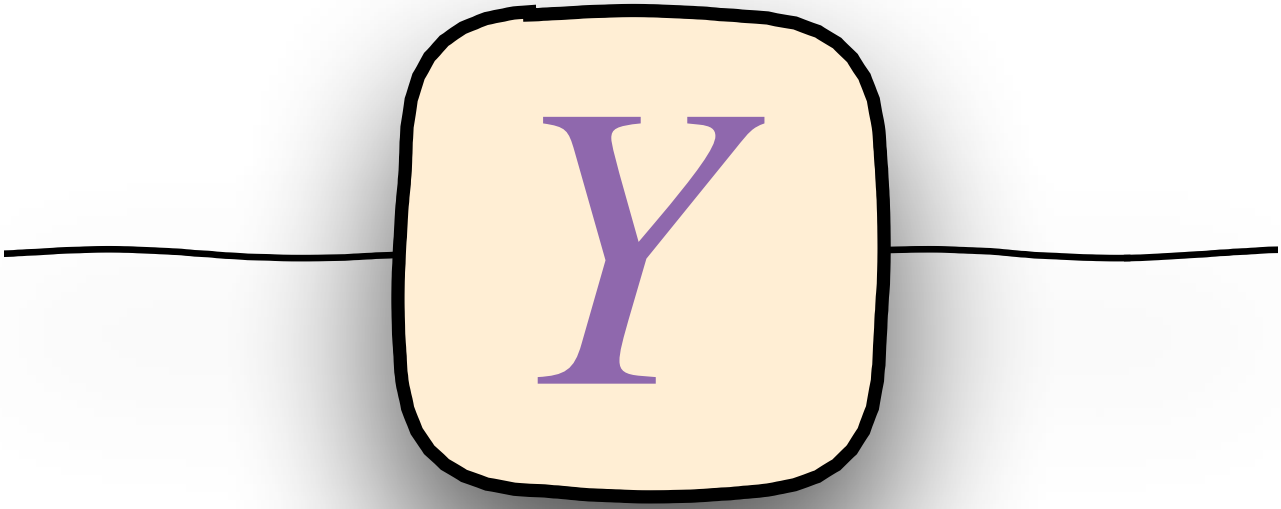
$$i\left(\alpha|1\rangle - \beta|0\rangle\right)$$

$$\alpha|0\rangle - \beta|1\rangle$$


$|0\rangle$
$Z|\psi\rangle$
$|\psi\rangle$
y
x
$X|\psi\rangle$
$Y|\psi\rangle$
$|1\rangle$

Z


X


Y