





John. A. A. A.











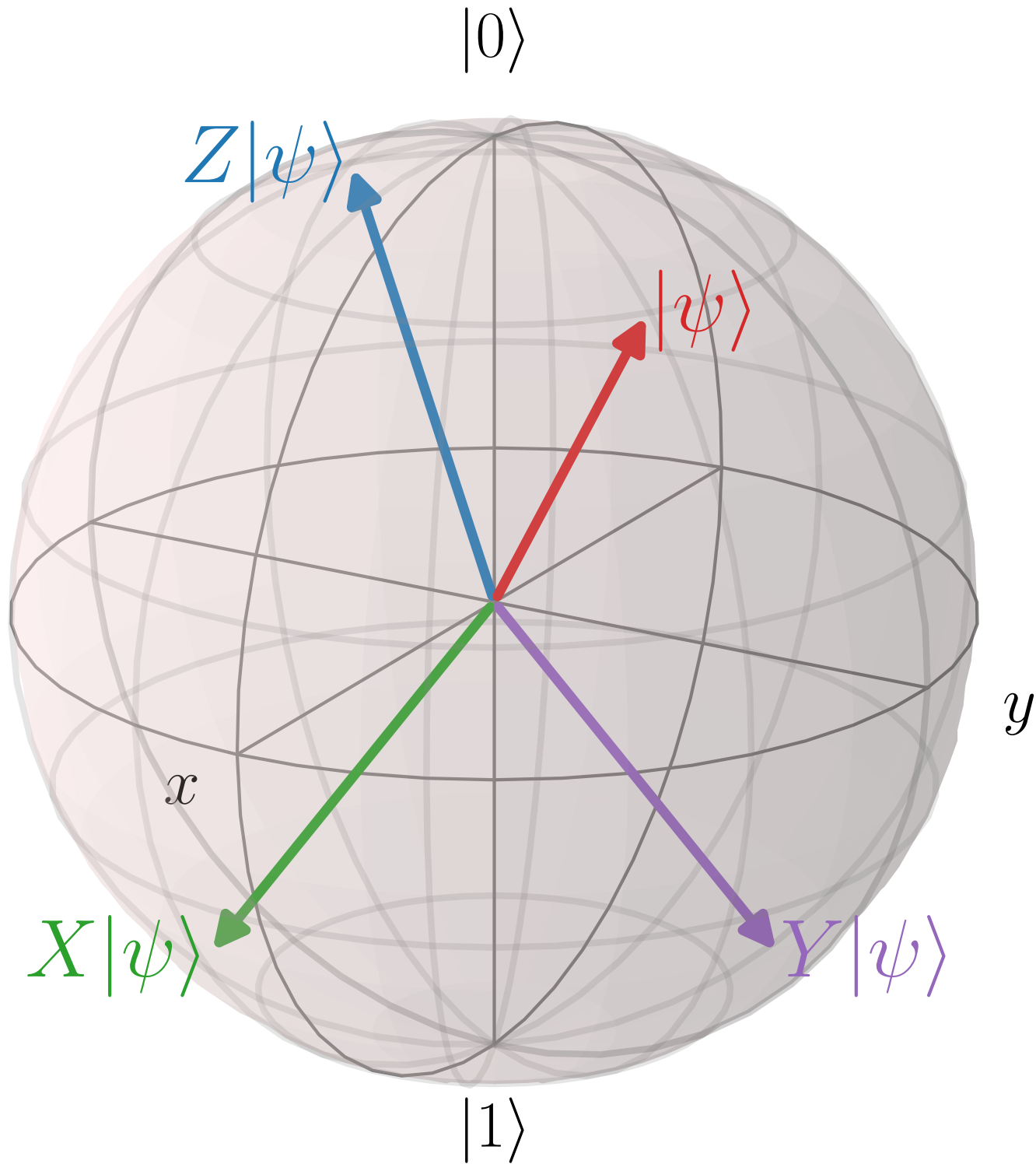
$$\alpha|0\rangle + \beta|1\rangle$$

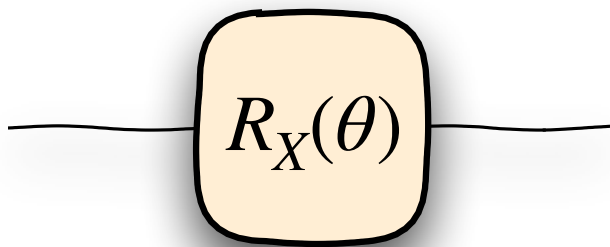
$$\alpha|1\rangle + \beta|0\rangle$$

$$i(a|1\rangle - \beta|0\rangle)$$

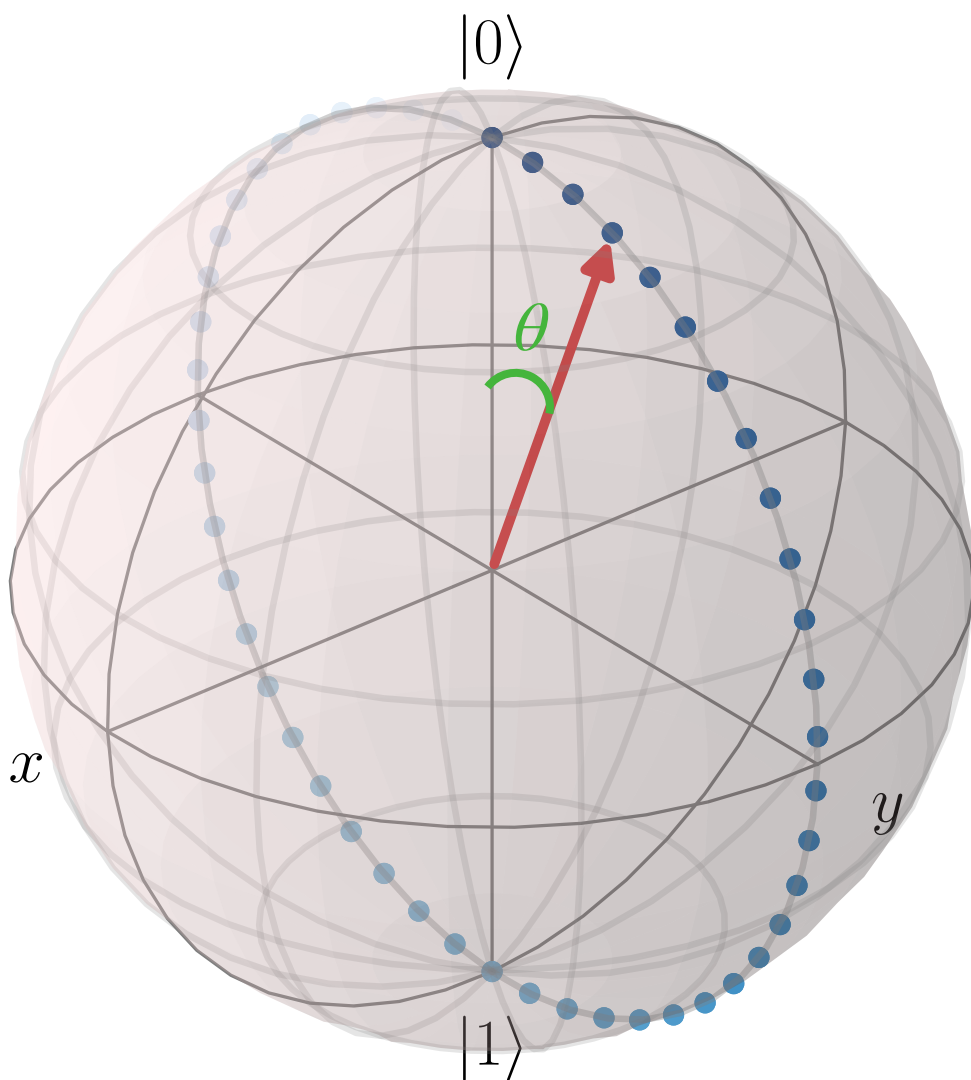
$$|a\rangle - |\beta\rangle$$

Parametrised unitary gates



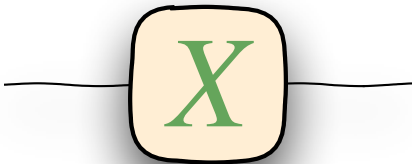


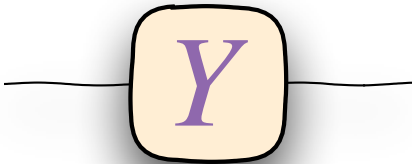
$$R_X(\theta) |0\rangle$$

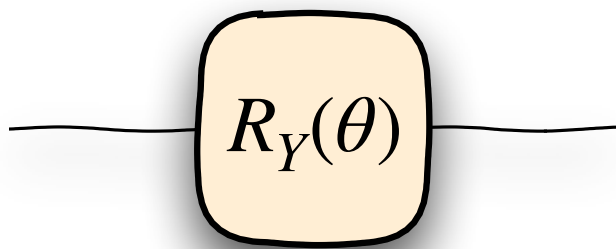




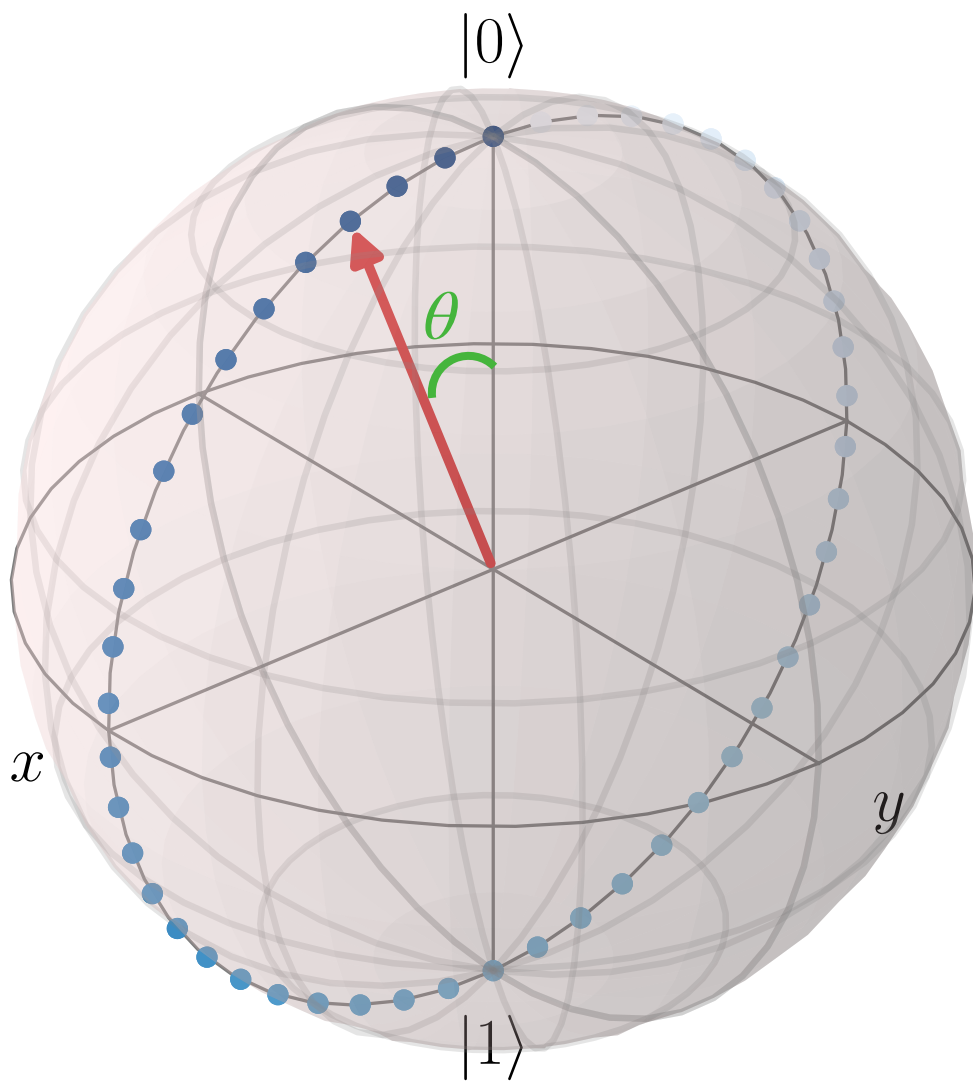


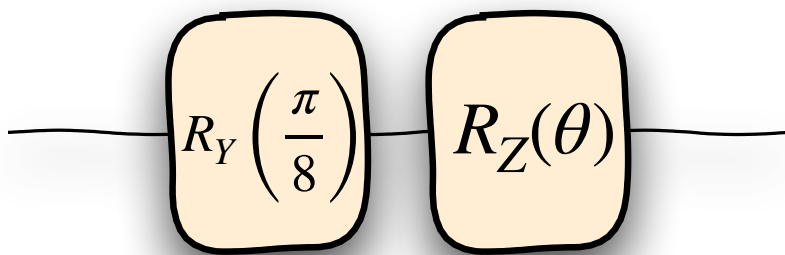




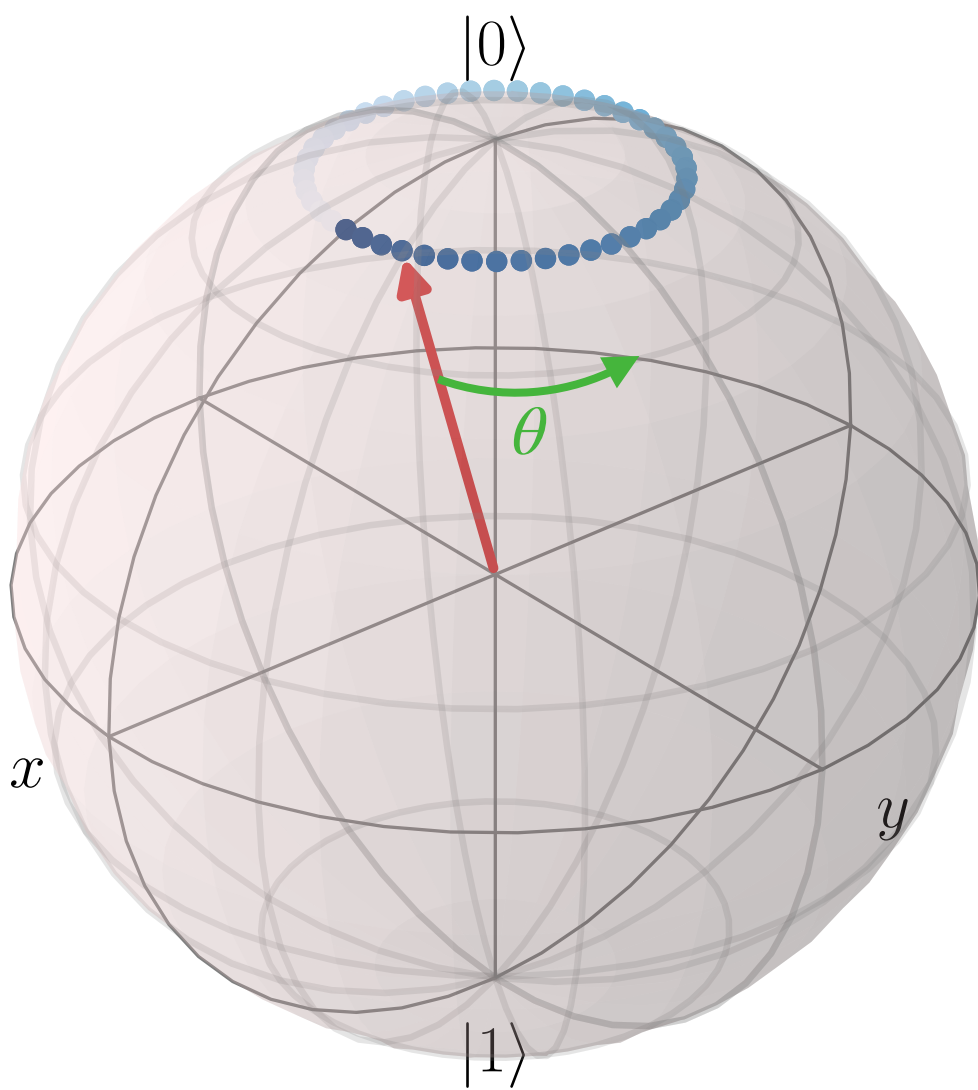


$$R_Y(\theta) |0\rangle$$





$$R_Z(\theta)R_Y(\pi/8)|0\rangle$$



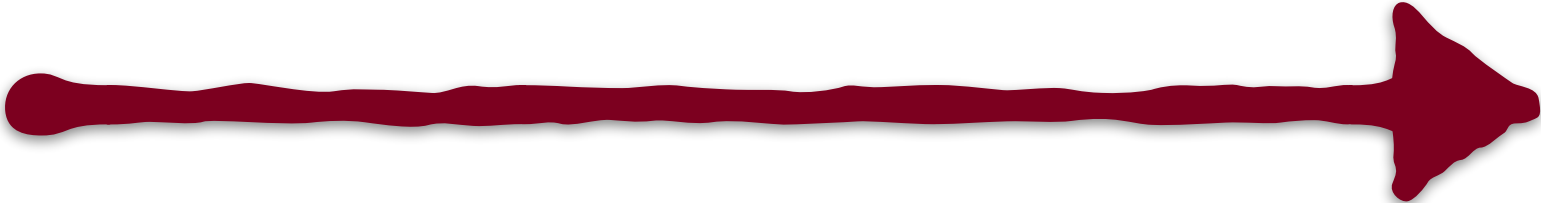




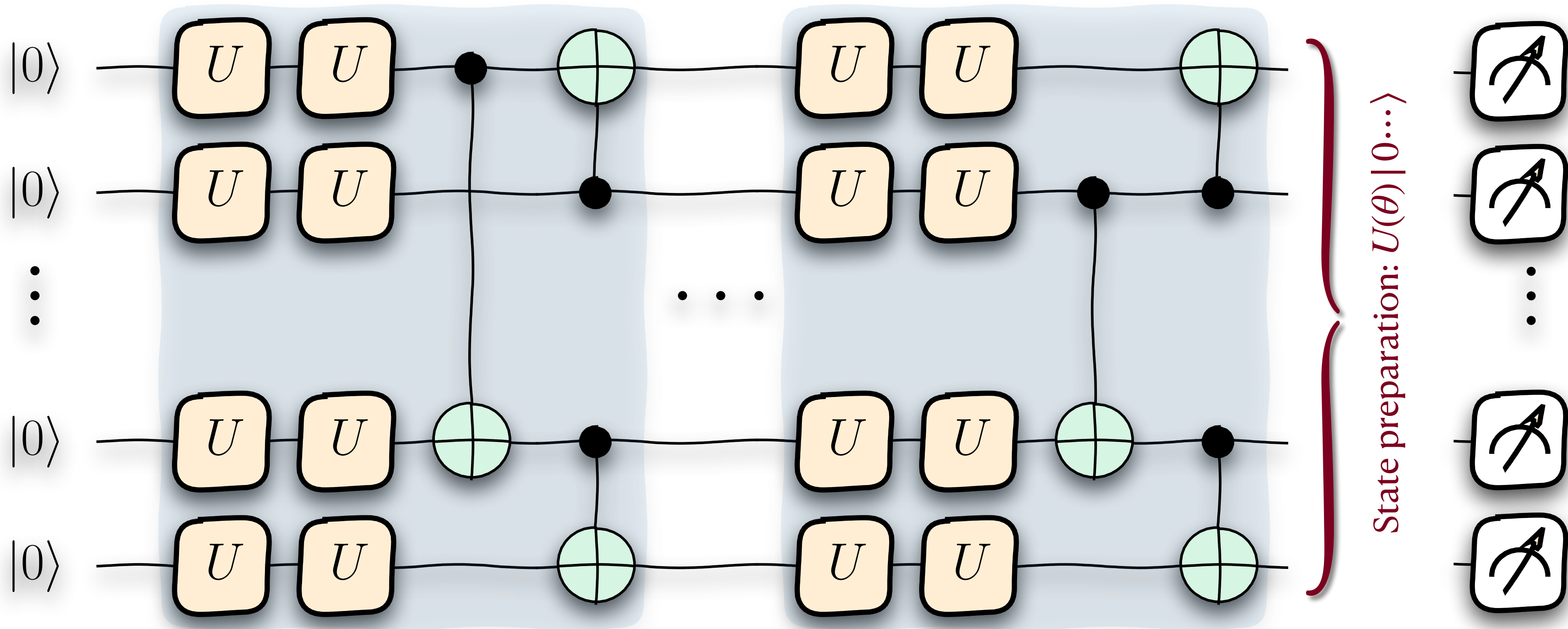
Initial state







Read from left to right!





## Single Qubit Gates

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



Two qubit gates

