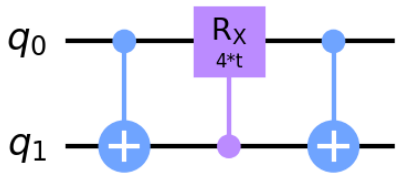
1 Compose two Pauli operator pairs spin subsystem

$$e^{-i\beta\sigma_x\otimes\sigma_x}e^{-i\beta\sigma_y\otimes\sigma_y} = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos^2\beta - \sin^2\beta & -2i\cos\beta\sin\beta & 0 \\ 0 & -2i\cos\beta\sin\beta & \cos^2\beta - \sin^2\beta & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

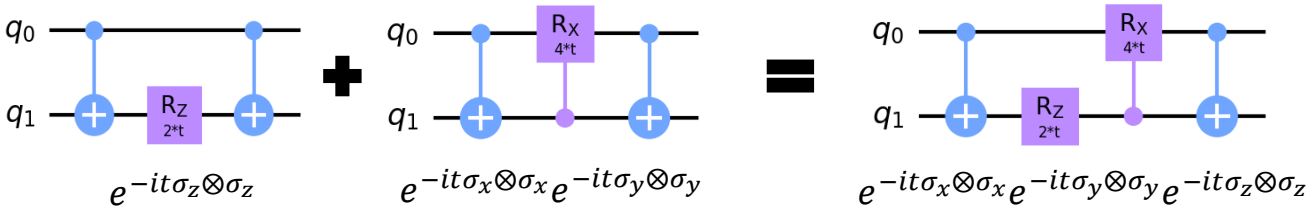
2 Build the quantum sub-circuit

$$\beta = t \quad \in \quad \{15°, 30°\}$$



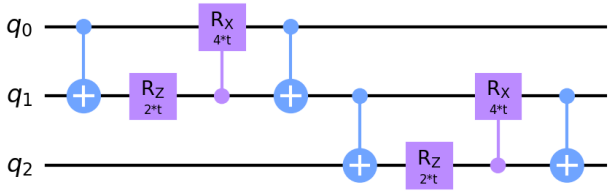
3 Append a known solution and simplify it

The building block



4 Join the building blocks together

The Trotter step for 3-particle Hamiltonian



5 Implement a basic error correction

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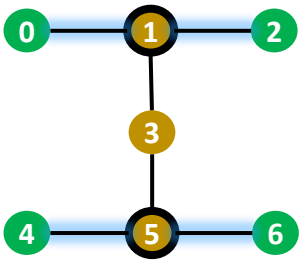

IBM quantum computer

The qubit represents a simulated particle

An auxiliary qubit used for the error correction

The qubit we want to correct

The physical connection between qubits

Entangled qubits (the entanglement is applied after all Trotter steps are implemented)