

## Quantum Time Evolution

Two particles are under the influence of an interaction with a Hamiltonian  $\omega_0 S_z$ . At  $t = 0$ , one particle is in the state  $|+\rangle$  and the other is in the state  $|+\rangle_x$ .

1. What state is each particle in at a time  $t$  later?
2. What is the probability that you would measure each particle to be in the  $|+\rangle$  state at time  $t$ ? Do these probabilities change with time?
3. What is the probability that you would measure each particle to be in the  $|+\rangle_x$  state at time  $t$ ? Do these probabilities change with time?
4. Given a Hamiltonian, how would you determine which states are stationary states (states that don't change with time)? Under what circumstances do measurement probabilities change with time?