

Spin-1 Time Evolution

1. Use a completeness relation to rewrite each of the states below in the z -direction.

- $|\psi_A\rangle = |-1\rangle_x$
- $|\psi_B\rangle = \frac{1}{\sqrt{2}}|+1\rangle_z - \frac{1}{\sqrt{2}}|-1\rangle_z$
- $|\psi_C\rangle = |-1\rangle_z$

2. Suppose the Hamiltonian is given by $\hat{H} = \omega_o \hat{S}_x$.

- Identify the energy eigenstates and their corresponding energy eigenvalues.
- Use them to write each state at a later instant in time.
- Represent each state using Arms as complex numbers.

3. For $|\psi_C\rangle$:

- List the possible values of a measurement of S_z and calculate the corresponding probabilities.
- List the possible values of a measurement of S_x and calculate the corresponding probabilities.
- Graph any probabilities that depend on time.