

CHAPTER OVERVIEW

10: Pauli Spin Matrices

We can represent the eigenstates for angular momentum of a spin-1/2 particle along each of the three spatial axes with column vectors:

$$\begin{aligned} | +z \rangle &= \begin{bmatrix} 1 \\ 0 \end{bmatrix} & | +y \rangle &= \begin{bmatrix} 1/\sqrt{2} \\ i/\sqrt{2} \end{bmatrix} & | +x \rangle &= \begin{bmatrix} 1/\sqrt{2} \\ 1/\sqrt{2} \end{bmatrix} \\ | -z \rangle &= \begin{bmatrix} 0 \\ 1 \end{bmatrix} & | -y \rangle &= \begin{bmatrix} i/\sqrt{2} \\ 1/\sqrt{2} \end{bmatrix} & | -x \rangle &= \begin{bmatrix} 1/\sqrt{2} \\ -1/\sqrt{2} \end{bmatrix} \end{aligned}$$

Similarly, we can use matrices to represent the various spin operators.

[10.1: Spin Operators](#)

[10.2: Expectation Values](#)

[10.3: Total Angular Momentum](#)

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