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:

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

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