

A Modern Physics Review

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February 8, 2023

A 'Quantum State' $|\Psi\rangle$ fully describes a system (Atom, Molecule, etc.)

Represented as a state vector:

$$|\Psi\rangle = \begin{pmatrix} c_1 \\ c_2 \\ \vdots \\ c_n \end{pmatrix}, \text{ where } c_n \text{ are complex amplitudes}$$

Examples (e.g.)

Spin-up

$$|+\mathbf{z}\rangle = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

Spin-down

$$|-\mathbf{z}\rangle = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

1 Practice Problem

1.1 Q7T.1

$$|\Psi\rangle = \begin{pmatrix} \frac{-1}{2} \\ \frac{3}{4}(1/2) \end{pmatrix}$$