

PENJUMLAHAN DUA SPIN

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$$\vec{S}_1 + \vec{S}_2 = \vec{S}$$

$$(\text{Space State}) \rightarrow \{|\epsilon_1, \epsilon_2\rangle\} = \{|+,+\rangle, |+,-\rangle, |-,+\rangle, |-, -\rangle\}$$

Dua partikel yang tidak saling berinteraksi dinyatakan dalam persamaan Hamiltonian

$$\{|r_1, r_2\rangle\}$$

$$H_0 = H_1 + H_2$$

$$\text{dengan } H_1 = -\frac{\hbar^2}{2\mu} \nabla_1^2 + V(r)$$

$$H_2 = -\frac{\hbar^2}{2\mu} \nabla_2^2 + V(r)$$

$V(r)$ = potensial sentral, ∇ = operator laplacian

$$[L_1, H_1] = 0 = [L_2, H_2]$$

Dua partikel berinteraksi dengan energy potensial $V(r_1 - r_2)$

Hamiltonian Sistem menjadi:

$$H = H_1 + H_2 + V(r_1 - r_2) \Rightarrow [L_1, H] = [L_1, V(r_1 - r_2)]$$

$$\vec{S}_1 + \vec{S}_2 = \vec{S} \rightarrow S_{1z} + S_{2z} = S_z ; S_{1x} + S_{2x} = S_x ; S_{1y} + S_{2y} = S_y$$

$$S^2 = (S_1 + S_2)^2 = S_1^2 + S_2^2 + 2S_{1z}S_{2z} + S_{1+}S_{2-} + S_{1-}S_{2+}$$