

$$(1) \quad H_0 = (E)_0 - a - a - aE_0 - a - a - aE_0$$

$$(2) \quad \begin{matrix} E_0 \\ a \\ 1 \\ 2 \\ 3 \end{matrix} H_0 \Psi = E \Psi (E)_0 - a - a - aE_0 - a - a - aE_0 (\psi)_1 \psi_2 \psi_3 = E (\psi)_1 \psi_2 \psi_3$$

$$\Psi = \psi_1 1 + \psi_2 2 + \psi_3 3$$

$$(3) \quad \det (E)_0 - E - a - a - aE_0 - E - a - a - aE_0 - E = 0 \begin{cases} E_1 = E_0 - 2a \\ E_2 = E_0 + a \\ E_3 = E_0 + a \end{cases}$$

$$\begin{matrix} E_1 \\ E_2 \\ E_3 \\ E_1 \\ E_2 \\ E_3 \end{matrix} =$$

$$(4) \quad E = E_1 (2) a - a - a - a2a - a - a - a2a (\psi)_1 \psi_2 \psi_3 = 0 \Psi_1 = \frac{1}{\sqrt{3}} (1) 11$$

$$(5) \quad \begin{matrix} \psi_1 + \\ \psi_2 + \\ \psi_3 = \\ 0 \end{matrix} E = E_2, E_3 (-) a - a - a - a - a - a - a - a - a (\psi)_1 \psi_2 \psi_3 = 0 \psi_1 + \psi_2 + \psi_3 = 0$$

$$(6) \quad \Psi_2 = \frac{1}{\sqrt{2}} (1) - 10 \Psi_3 = \frac{1}{\sqrt{6}} (1) 1 - 2$$

$$(7) \quad \begin{matrix} \Psi_1 \\ \Psi_2 \\ \Psi_3 \\ \Psi_1 \\ \Psi_2 \\ \Psi_3 \\ V_0 \\ a \end{matrix} H = H_0 + \gamma H_1 = (E)_0 - V_0 - a - a - aE_0 - a - a - a - E_0$$

$$(8) \quad \gamma = \frac{V_0}{a}$$

$$(9) \quad \begin{matrix} H_1 \\ H_1 = (-) a00000000 \end{matrix}$$

$$(10) \quad \begin{matrix} time \\ in- \\ pen- \\ dent \\ pur- \\ tur- \\ ba- \\ tion \\ the- \\ ory \end{matrix} H \Psi = \lambda \Psi$$

$$(11) \quad \begin{matrix} H \\ H \\ H \end{matrix} = E_0 I_{3 \times 3} - a (\gamma) 11101110$$

$$(12) \quad \begin{matrix} I_{3 \times 3} \\ 3 \\ \lambda = \\ E_0 - \\ a \lambda_1 \\ \lambda_1 \end{matrix} \det (\gamma) - \lambda_1 111 - \lambda_1 111 - \lambda_1 = 0 (\gamma - \lambda_1) (\lambda_1^2 - 1) + 2 (\lambda_1 + 1) = 0$$

$$(13) \quad \begin{matrix} V_0 \ll \\ a \\ \gamma \ll \\ 1 \end{matrix} \begin{cases} \lambda_1 = \frac{1+\gamma}{2} + \sqrt{\frac{(1+\gamma)^2}{4} + 2 - \gamma E_1} \approx E_0 - a \left(2 + \frac{\gamma}{3}\right) = E_0 - 2a - \frac{1}{3} V_0 \\ \lambda_1 = \frac{1+\gamma}{2} - \sqrt{\frac{(1+\gamma)^2}{4} + 2 - \gamma E_2} \approx E_0 - a \left(-1 + \frac{2}{3} \gamma\right) = E_0 + a - \frac{2}{3} V_0 \\ \lambda_1 = 1 \quad E_3 = E_0 + a \end{cases}$$