

$$\begin{array}{l} S\in \\ R^3 \\ x,S_y,S_z) \\ S_{x_i} \\ \hat{x}_i \\ P^3 \\ S \\ S_i \\ S_i \end{array}$$

$$\begin{array}{l} S \\ \hat{i} \\ R^3 \\ {}_i(S)= \\ {}_i|S \end{array}$$

$$\begin{array}{l} \hat{k} \\ j \\ com- \\ pat- \\ i \\ ble \\ S_i \\ S_j \\ S_i \\ S_i \\ spin- \\ up \\ spin- \\ down \end{array}$$

$$\begin{array}{l} \frac{\hbar}{2} \\ S_i \\ quan- \\ tized \end{array}$$

$$\begin{array}{l} S_i \\ S_i \\ S_j \\ in- \\ com- \\ pat- \\ i \\ ble \\ S_i \\ \psi \\ \mathcal{H} \\ \frac{1}{2} \\ \mathcal{H}=\{\alpha++\beta-\} \end{array}$$

$$(1) \quad \alpha,\beta \in$$

$$\begin{array}{l} C \\ A \\ \mathcal{H} \\ A \\ A \\ S_z \\ \dot{=} \\ \frac{\hbar}{2}10 \\ 0- \\ 1 \\ z \\ (S_z=\frac{\hbar}{2}) \\ \psi = \\ +_z \dot{=} \\ 0 \\ z \\ (S_z=\frac{-\hbar}{2}) \\ \psi = \\ -_z \dot{=} \\ 0 \\ 1 \\ S_y \\ S_z \\ \dot{=} \\ \frac{\hbar}{2}0- \\ i0 \\ y \\ (S_y=\frac{\hbar}{2}) \\ \psi = \\ +_y \dot{=} \\ \frac{1}{\sqrt{2}}1 \\ i \\ y \\ (S_y=\frac{-\hbar}{2}) \\ \psi = \\ -_y \dot{=} \\ \frac{1}{\sqrt{2}}1 \\ - \\ i \end{array}$$