

$$S_{\pm} = S_x \pm iS_y$$

$$S_+ |\uparrow\rangle = 0 \quad S_- |\downarrow\rangle = 0$$

$$S_+ |\downarrow\rangle = \hbar |\uparrow\rangle \quad S_- |\uparrow\rangle = \hbar |\downarrow\rangle$$