



$$\begin{aligned}
 |\Psi\rangle_{\text{AP}} &= \frac{1}{\sqrt{2}} \left(|\downarrow\rangle_z |L\rangle + |\uparrow\rangle_z |R\rangle \right) \\
 &= \frac{1}{\sqrt{2}} \left(|\downarrow\rangle_x |V\rangle + |\uparrow\rangle_x |H\rangle \right)
 \end{aligned}$$

$$\text{A} \quad |\Psi^+\rangle_{\text{AA}} = \frac{1}{\sqrt{2}} \left(|\uparrow\rangle_x |\downarrow\rangle_x + |\downarrow\rangle_x |\uparrow\rangle_x \right)$$

$$\text{B} \quad |\Psi^-\rangle_{\text{AA}} = \frac{1}{\sqrt{2}} \left(|\uparrow\rangle_x |\downarrow\rangle_x - |\downarrow\rangle_x |\uparrow\rangle_x \right)$$