



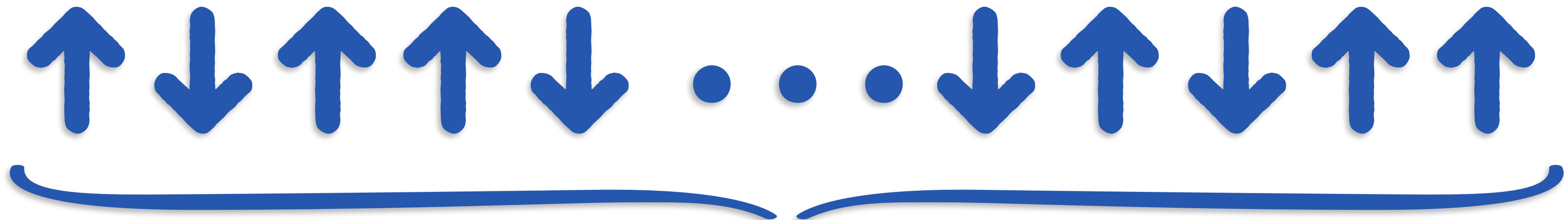


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System of electrons with
spin up or down

What's its natural form?

Ground state: $|gs\rangle \rightarrow \hat{H}|gs\rangle = E_{gs}|gs\rangle$

A random state: $|\psi\rangle \rightarrow \hat{H}|\psi\rangle \geq E_{\text{gs}} |\text{gs}\rangle$

$$\hat{U}(\theta)|0\rangle = |\psi(\theta)\rangle \rightarrow \langle \psi(\theta) | \hat{H} | \psi(\theta) \rangle \geq \langle \text{gs} | \hat{H} | \text{gs} \rangle$$

Groundstate:

$$|gs\rangle \rightarrow \hat{H} |gs\rangle = E_{gs} |gs\rangle$$

Arandornstate:

$$|\psi\rangle \rightarrow \hat{H}|\psi\rangle \geq E_{\text{gs}}|\text{gs}\rangle$$

