

Case III

Identical Fermions

$$\begin{aligned}\Psi_{(1,1)} &= E_{11} = (1^2 - 1^2)K \\ &= 0(K) \\ &= 0\end{aligned}$$

$$\Psi_{11} = \left[\frac{2}{2} \sin\left(\frac{\pi x_1}{2}\right) \sin\left(\frac{\pi x_2}{2}\right) \right] - \left[\frac{2}{2} \sin\left(\frac{\pi x_2}{2}\right) \sin\left(\frac{\pi x_1}{2}\right) \right]$$

$= 0$

$$\Psi_{12} = \left[\frac{2}{2} \sin\left(\frac{\pi x_1}{2}\right) \sin\left(\frac{2\pi x_2}{2}\right) \right] - \left[\frac{2}{2} \sin\left(\frac{2\pi x_1}{2}\right) \sin\left(\frac{\pi x_2}{2}\right) \right]$$

↑ excited state

$$\begin{aligned}E_{12} &= (1 + 4)K \\ &= 5K\end{aligned}$$