Interchange operator

$\hat{P}\psi(\vec{r}_1, \vec{r}_2) = \psi(r_2, r_1)$ [exchange operator]

or, $\hat{P}\psi(\vec{r}_2, \vec{r}_1) = \psi(r_1, r_2)$

$P^2\psi(\vec{r}_1, \vec{r}_2) = \psi(\vec{r}_1, \vec{r}_2)$

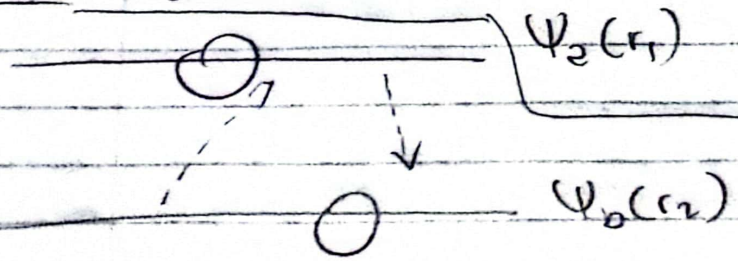
$\boxed{P = \pm 1}$ since $P^2 = 1$

When particles are indentical

$[P, H] = 0$

↳ hamiltonian

When identical particles change state, it cannot be distinguished as to whether there is a changed state or not



- $[P, H]$ commuting as they have the same eigen state & eigen value

- $\psi(\vec{r}_1, \vec{r}_2) = \pm\psi(\vec{r}_2, \vec{r}_1)$

Aditya