

PHYS2210Spring2024HomeworkProblem42

42) Adapted from Townsend Problem 7.3

The spatial wavefunction for two identical particles where one is in the ground state and the other is in the first excited state of a particle in a one dimensional box of length L can be expressed as either a combination that is symmetric under exchange or antisymmetric.

Calculate the probability that the position of the two particles finds them both in the left hand side of the box, that is $0 < x_1 < L/2$ and $0 < x_2 < L/2$, for each of these symmetry combinations. Carry out this calculation symbolically showing steps and then evaluate the probability.