

StudentID: _____

PHYS 451 Quantum Mechanics II (Fall 2018)

Quiz #4

A particle of mass m is trapped in a 2D infinite square well ($0 < x < a$, $0 < y < a$). Inside the well there is a small sharp bump in the form:

$$V(x, y) = \beta \delta(x - a/4) \delta(y - a/4),$$

where $\delta(\dots)$ is the Dirac delta function and β is a small positive constant.

1. How small must β be so that the perturbation theory is applicable?
2. Consider the first excited state of this system. Find the first-order correction to its energy.