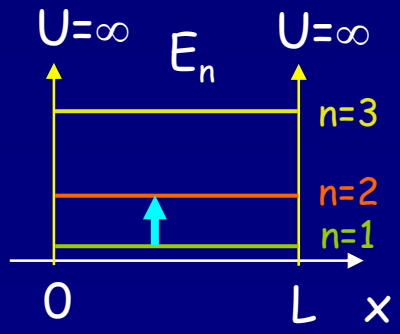
Quantum Wire Example

An electron is trapped in a "quantum wire" that is L = 4 nm long. Assume that the potential seen by the electron is approximately that of an infinite square well.

1: Calculate the ground (lowest) state energy of the electron.

2: What photon energy is required to excite the trapped electron to the next available energy level (*i.e.*, n = 2)?



The idea here is that the photon is absorbed by the electron, which gains all of the photon's energy (similar to the photoelectric effect).