The Energy is Quantized Due to Confinement by the Potential

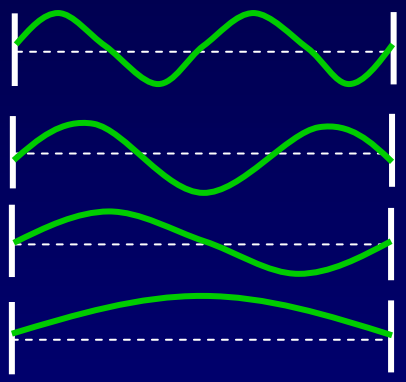
The discrete E_n are known as "energy eigenvalues":

$$n\lambda_n = 2L$$

electron

$$E_n = \frac{p^2}{2m} = \frac{h^2}{2m\lambda_n^2} = \frac{1.505\ eV \cdot nm^2}{\lambda_n^2}$$

$$\boxed{E_n = E_1 n^2} \quad \text{where} \quad \boxed{E_1 \equiv \frac{h^2}{8mL^2}}$$



n	λ (= v/f)	E
4	L/2	$16E_1$
3	2L/3	$9E_1$
2	L	$4E_1$
1	2L	E_1

Important features:

- Discrete energy levels.
- $E_1 \neq 0$ ← an example of the uncertainty principle
- Standing wave (±p for a given E)
- n = 0 is not allowed. (why?)