What must occur when an electron in an atom returns from a higher energy state to a lower energy state?

Answer:

When an electron in an atom returns from higher energy state to a lower energy state, the total energy of atom decreases and occur **emission of a photon.** The frequency radiation is:

$$\nu = \frac{E_2 - E_1}{h},$$

where E_2 – energy of higher level; E_2 - energy of lover level; h – Plank's constant.