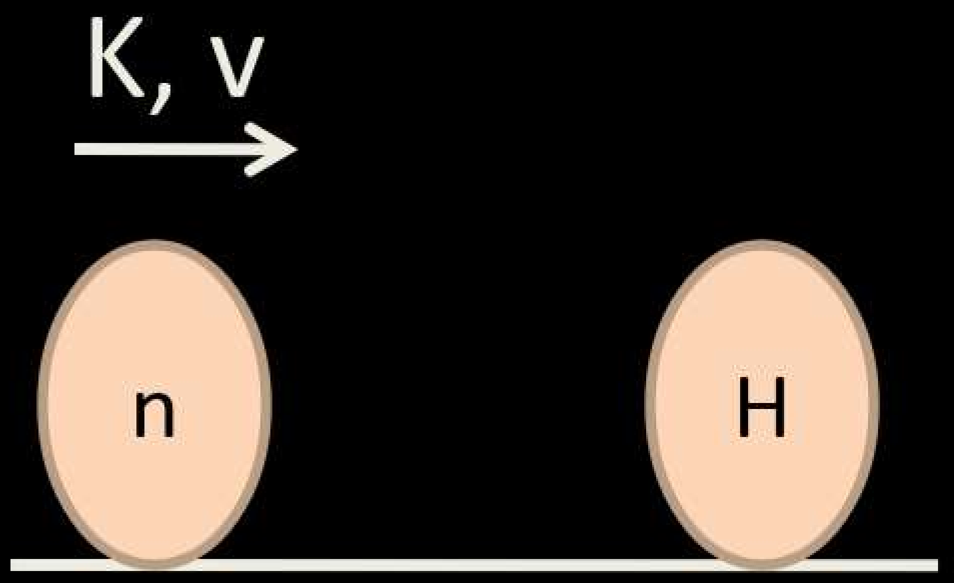
Bohr's Atomic Model **(1913): Ionization & Excitation – Atomic Collision**

Q 1). H-atom at rest in ground state & free to move. Neutron with kinetic energy, **K** collides with it. What will be the type of collision, if

K = 14 eV, 20.4 eV, 22 eV, 24.18 eV



$$\Delta E_{Newt.Mech} = [0, K/2]$$

Basic Information about X-Rays ?

Soft X-Rays

10 – 100 Å

less energy

Hard X-Rays

0.1 – 10 Å

more energy

EM Spectrum

- γ rays – < 0.1 Å
- X rays – 0.1 – 100 Å
- UV – 100 – 4000 Å
- Visible – 4000 – 8k Å
- IR – 8k Å – 10^5 Å
- Microwave – 10^{-3} m – (m)
- Radiowave

Continuous X-Rays

Two possibilities when e^- strikes the metal →

① It won't have any collision

$eV = \frac{1}{2} mv^2$ → ② It will collide with an e^-

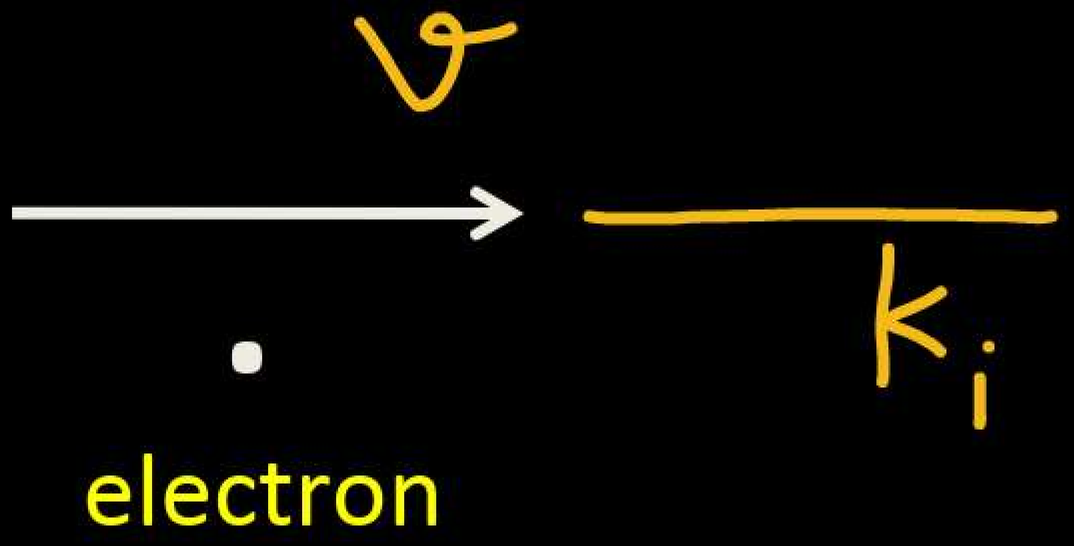
electron

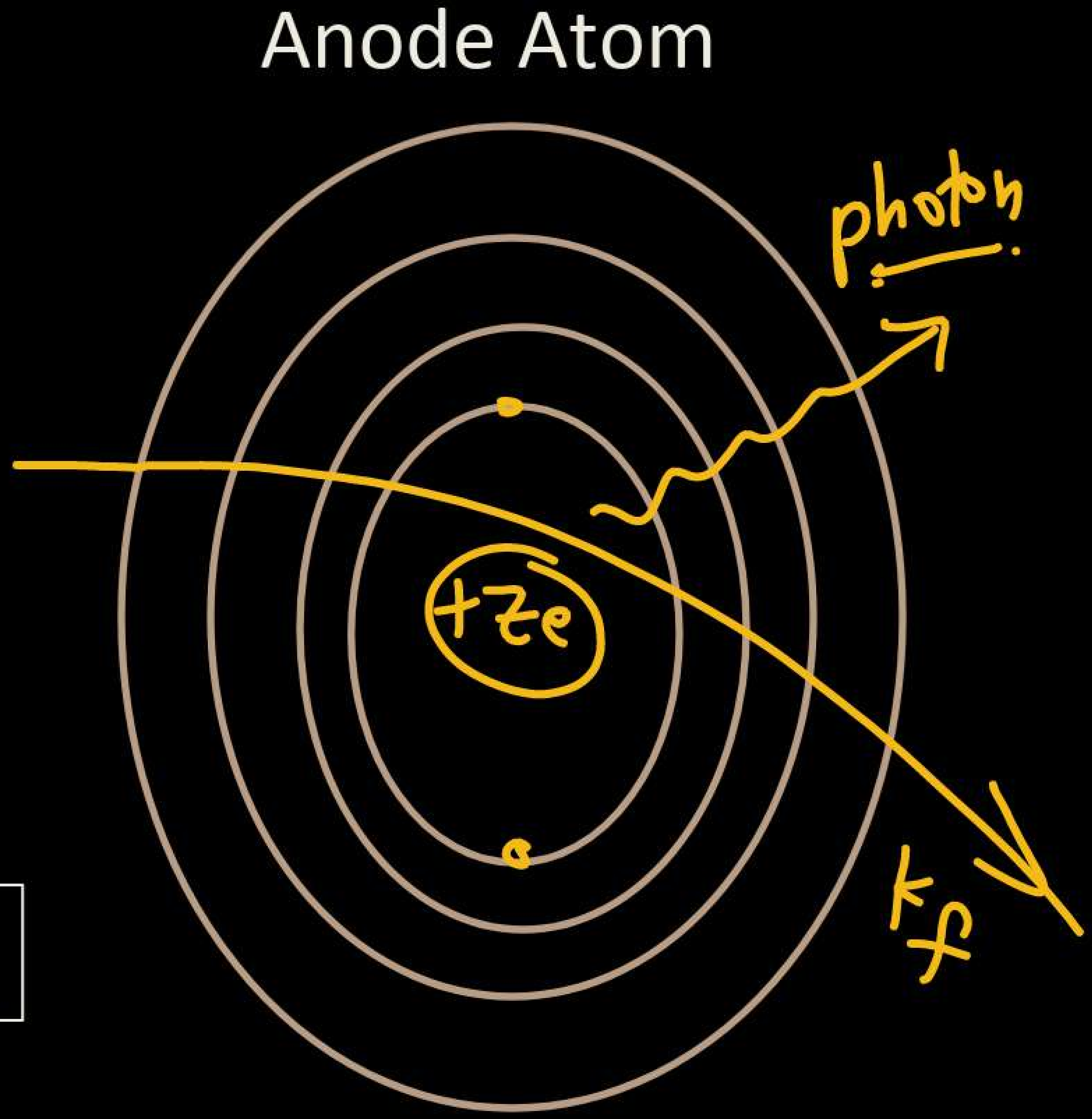
Anode Atom

Loss in energy of electron = $\Delta E = K_i - K_f$

Continuous X-Rays

$eV = \frac{1}{2} mv^2$





Loss in energy of electron = $\Delta E = K_i - K_f$

Spectrum of Continuous X-Rays

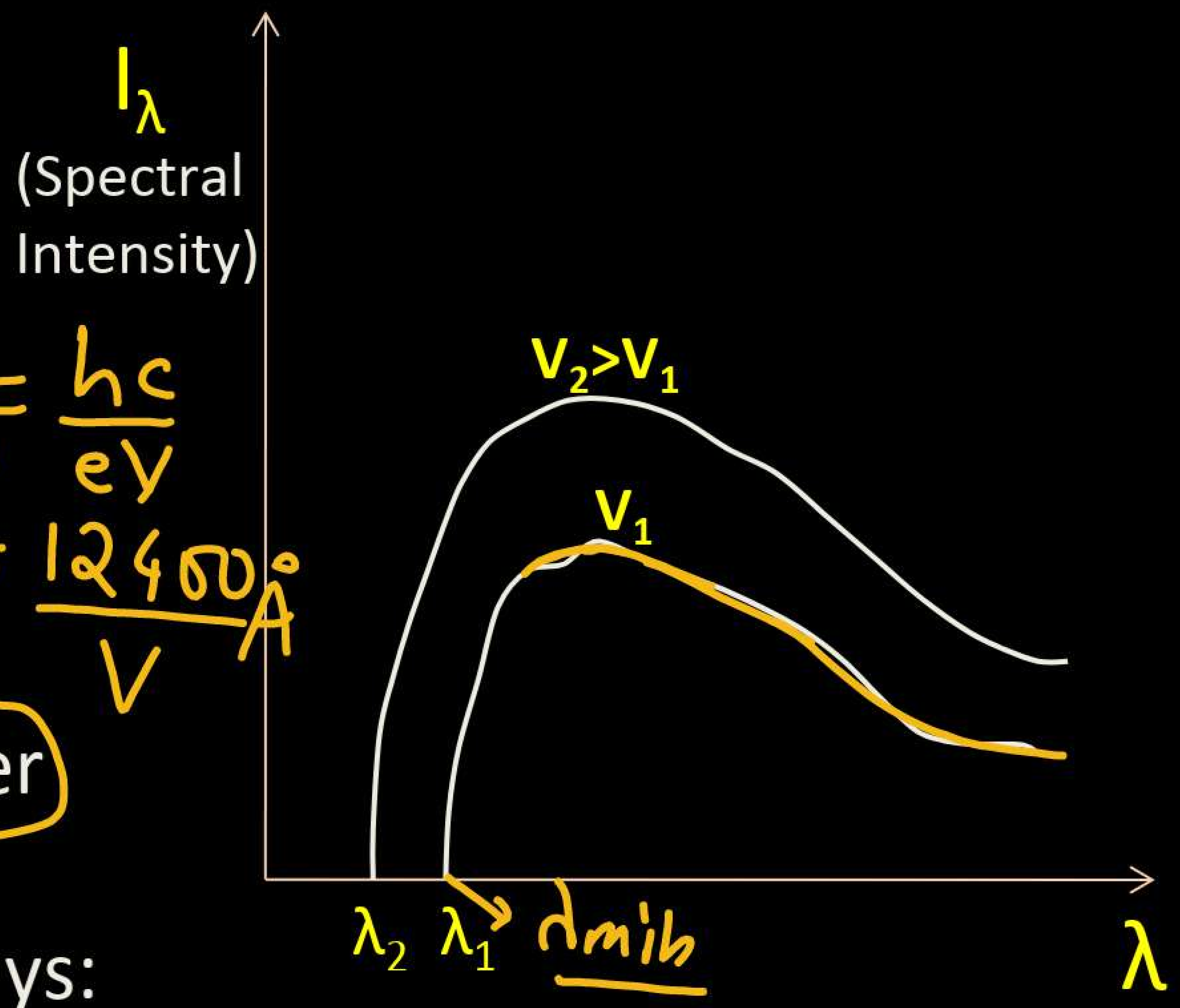
- Maximum photon energy emitted

$$eV = \frac{1}{2}mv^2$$

filament voltage

$$\frac{hc}{\lambda_{min}} = eV \Rightarrow \lambda_{min} = \frac{hc}{eV} = \frac{12400}{V}\ \text{Å}$$

- Polychromatic continuous radiation
- Intensity & Penetrating power
- Efficiency (1-2% only)
- Spectrum of continuous X-Rays:



Quantum Mechanical Model

n, l, m_l & m_s

total $2n^2$ quantum states.

	$n=1$	$n=2$	$n=3$	$n=4$	← Bohr's quantum No
	2	8	18	32	← Total quantum States.
Shells	K	L	M	N	