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O-I 30-36

S-I 37-40 → (33) (39)

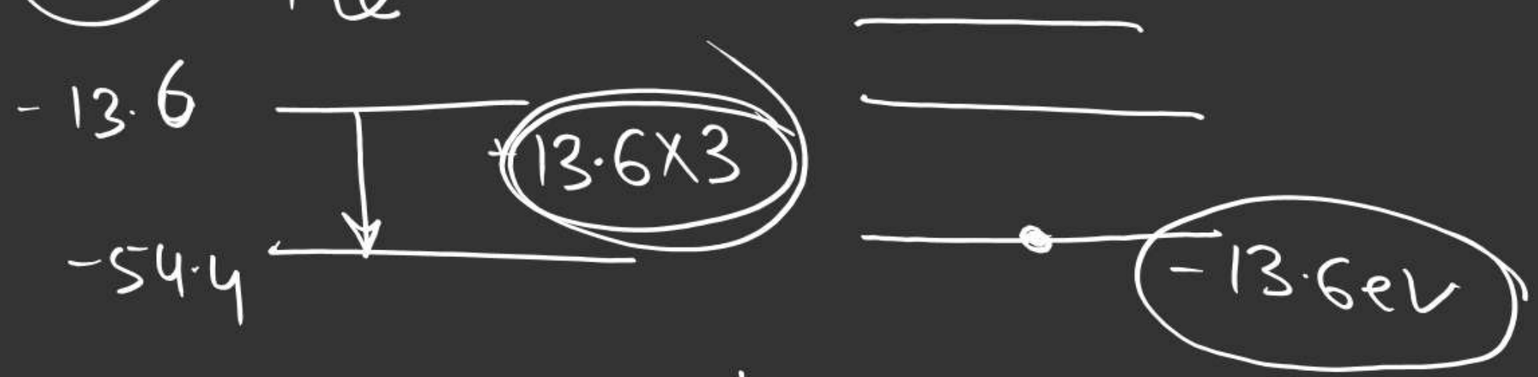
O-II 1-10

$KE_{max} = h\nu - W$

$2KE = h \times 3.2 \times 10^{15} - W$

$KE = h \times 2 \times 10^{15} - W$

(40) He^+



$13.6 \times 2 = KE = \frac{1}{2}mv^2$

(R) $R_0(A)^{1/3}$

(6) $E_n = \frac{E_1}{n^2}$

$E_1 \rightarrow \frac{E_1}{4} = 24$

$PE = -13.6 \times 2 Z^2/n^2$

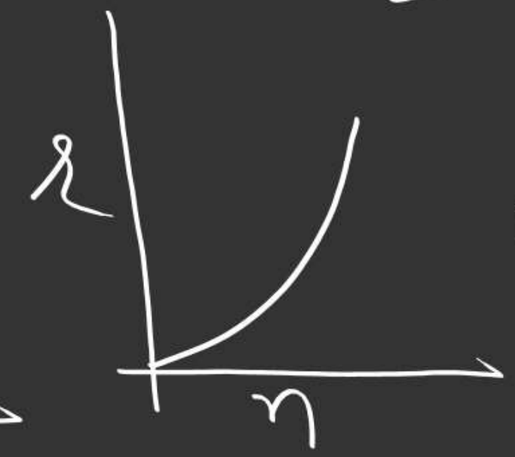
$5h/2\pi$ $1.5h/\pi$

$4h/2\pi$ h/π

$3h/2\pi$ $0.5\frac{h}{\pi}$

$\frac{h}{\pi}$ $\ell \propto n^2/2$

$v \propto Z/n$



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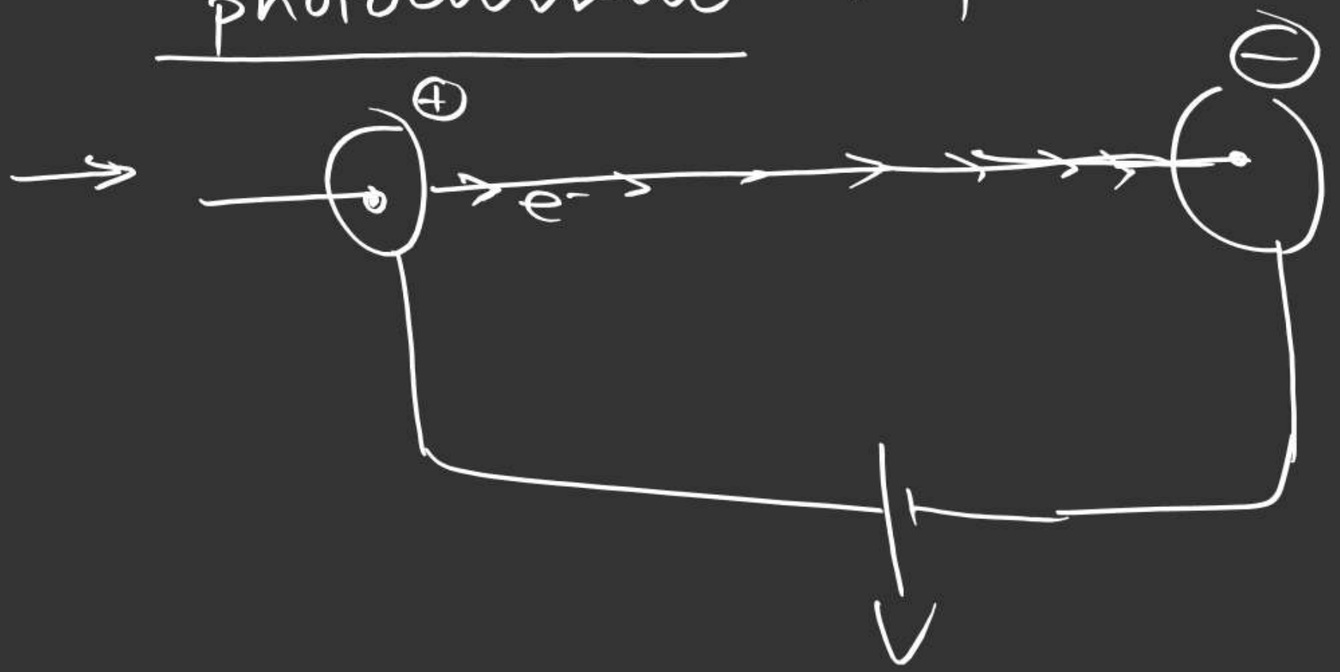
photoelectric effect

$$KE_{max} = h\nu - \phi$$

photocurrent → photon intensity ✓ ~~frequency~~



$$\Delta KE = qV$$

q: Charge on particle

V: Potential difference

Q. find ΔKE of an e^- and α-particle accelerated by 10 volt.

$1eV = 1.6 \times 10^{-19} J$

Ans (i) for e^-

$$\Delta KE = q \times V$$
$$= 1.6 \times 10^{-19} \times 10 \ J$$
$$= 10 \ eV$$

(ii) for He^{2+}

$$\Delta KE = 2e \times 10 \ J$$
$$= 20 \ eV$$

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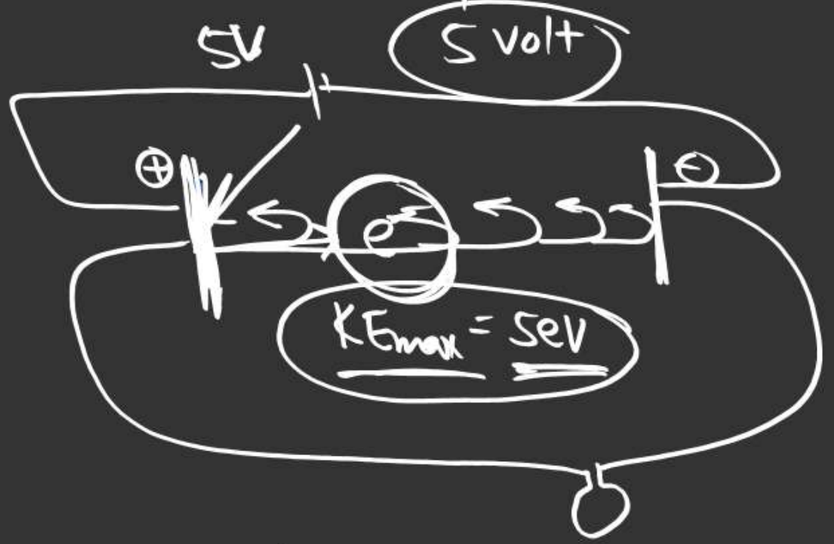

Stopping potential (V_0)

minimum potential required to stop the photocurrent.

$$KE_{max} - qV_0 = 0$$

$$\boxed{KE_{max} = qV_0}$$

→ Stopping potential depends frequency and independent of photointensity

Q. Find the photocurrent produced by a bulb of 160 W power if it emits photon of $\lambda = 310$ nm. Assuming all the emitted photons are striking and ejecting photoelectrons (Given $\phi = 2eV$)

$$E_{h\nu} = \frac{1240\ eV \cdot nm}{310} = 4eV$$

$$\text{no. of photons} = \frac{100 J/sec}{4 \times 1.6 \times 10^{-19} J}$$

$$= 25 \times 10^{19} = \text{no. of } e^- \text{ ejected}$$

$$\text{Charge per sec} = 25 \times 10^{19} \times 1.6 \times 10^{-19}$$

$$= 40 \text{ amp.}$$

240
40 amp
20
4
25×10^{19}

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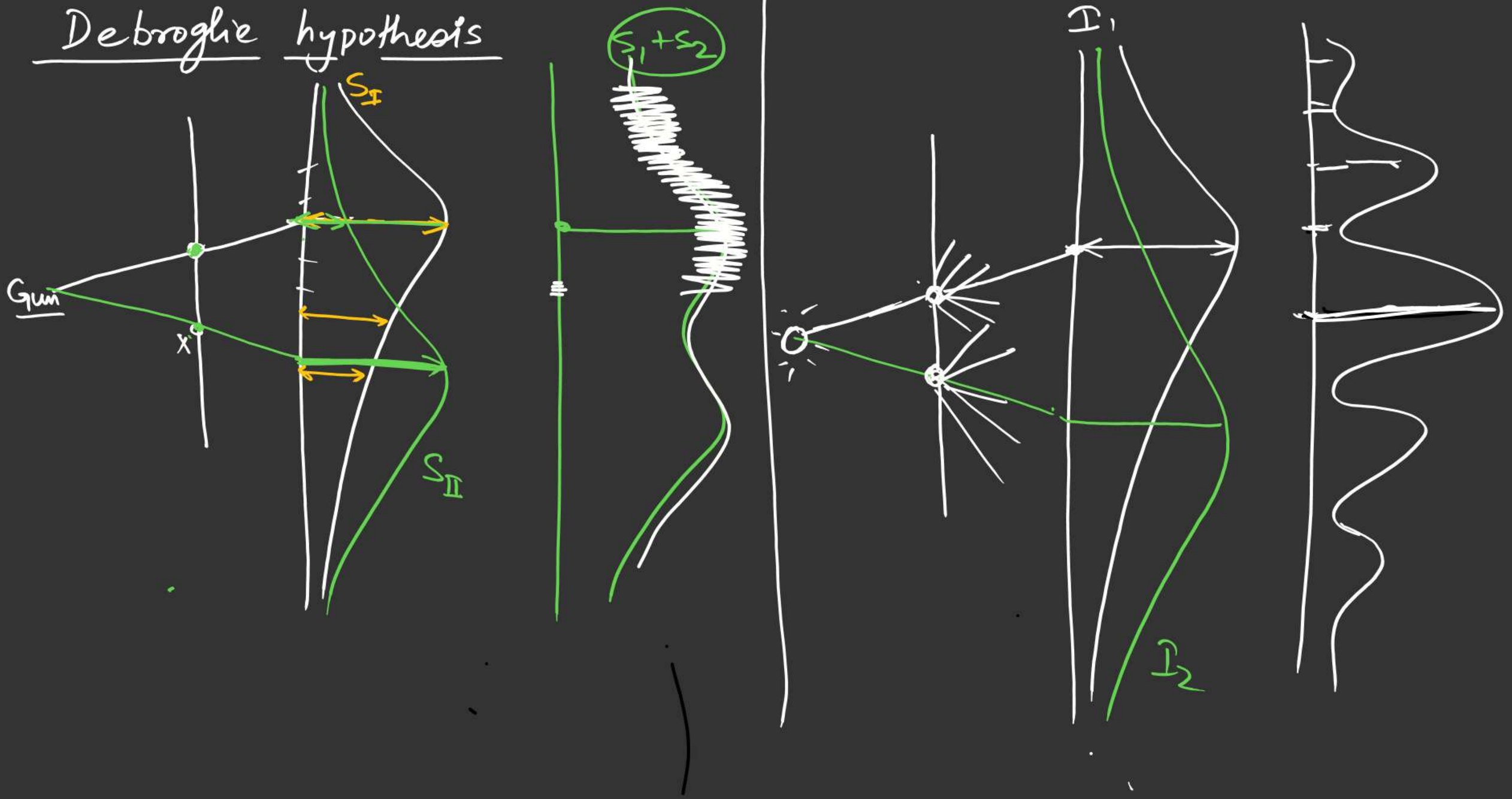
Debroglie hypothesis



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S-II 1-10