

## TUTORIAL 1

### EE 475

For a certain gas under constant E/P with constant photoelectric current the following ionization currents are measured.

at  $d_1 = 1.0 \text{ cm}$        $I_1 = 9.5 \times 10^{-12} \text{ A}$

at  $d_2 = 2.0 \text{ cm}$        $I_2 = 9.5 \times 10^{-9} \text{ A}$

Neglect secondary processes

a) find

b) find  $I_0$

a)

$$I = I_0 \cdot e^{\alpha \cdot d}$$

$$\Rightarrow \frac{I_1}{I_2} = e^{\alpha(d_1 - d_2)}$$

$$\ln\left(\frac{I_1}{I_2}\right) = \alpha(d_1 - d_2)$$

$$\ln\left(\frac{5 \cdot 10^{-12}}{5 \cdot 10^{-9}}\right) = \alpha(1 - 2) \Rightarrow \alpha = 6.91 \text{ cm}^{-1}$$

b)

$$I_1 = I_0 \cdot e^{\alpha \cdot d_1}$$

$$9.5 \times 10^{-12} = I_0 \cdot e^{(6.91)(1)}$$

$$\Rightarrow I_0 = \frac{9.5 \times 10^{-12}}{e^{(6.91)}} = 9.48 \times 10^{-15} \text{ A}$$