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Lab # 2

**Electron Gun – Effects of Electric Field**

1. **Objective**

To observe the effect of an electric field on the motion of electrons and to show relationship between the field stretch and the distance electron are deflected.

1. **Data/ Results:**

∆y: distance electron is deflected (mm)

x: voltage ratio

k: tube constant (mm)

∆: acceleration voltage (V)

∆: deflection voltage (V)

=>x= => k=

Let’s do trial data#1: ∆Va=, ∆y =15 mm,

x=

k=

Tube constant k average= = (mm)

**Data # 1: ∆Va=**

|  |  |  |  |
| --- | --- | --- | --- |
| **∆y(mm)** | **∆Vd(V)** | **x=** | **k=(mm)** |
| **15** | 13.3 |  | 281.95 |
| **12** | 10.69 | .04276 | 280.63 |
| **9** | 8.20 |  | 274.4 |
| **6** | 5.33 |  | 281.42 |
| **3** | 2.64 |  | 284 |
| **0** | 0 | 0 | 0 |
| **-3** | -2.58 |  | 290.7 |
| **-6** | -5.17 |  | 290.135 |
| **-9** | -8.27 |  | 272.06 |
| **-12** | -10.56 |  | 284.09 |
| **-15** | -13.15 |  | 285.17 |

Total of tube constant k = 2824.555mm

Tube constant k average=

**Data # 2: ∆Va=**

|  |  |  |  |
| --- | --- | --- | --- |
| **∆y(mm)** | **∆Vd(V)** | **x=** | **k=(mm)** |
| **15** | 20.98 |  | 272.72 |
| **12** | 16.81 |  | 267.85 |
| **9** | 19.38 |  | 174.08 |
| **6** | 8.87 |  | 254.23 |
| **3** | 5.02 |  | 225.56 |
| **0** | 0 | 0 | 0 |
| **-3** | -2.96 |  | 384.61 |
| **-6** | -7.15 |  | 315.78 |
| **-9** | -10.65 |  | 316.90 |
| **-12** | -14.18 |  | 317.46 |
| **-15** | -17.96 |  | 313.8 |

Total of tube constant k = 2842.9mm

Tube constant k average=

**Data # 3: ∆Va= 500V**

|  |  |  |  |
| --- | --- | --- | --- |
| **∆y(mm)** | **∆Vd(V)** | **x=** | **k=(mm)** |
| **15** | 28.01 |  | 267.85 |
| **12** | 23.35 |  | 256.95 |
| **9** | 17.71 |  | 257.14 |
| **6** | 12.76 |  | 235.29 |
| **3** | 7.45 |  | 201.34 |
| **0** | 0 | 0 | 0 |
| **-3** | -3.34 |  | 449.1 |
| **-6** | -8.44 |  | 355.45 |
| **-9** | -13.92 |  | 323.74 |
| **-12** | -20.37 |  | 294.55 |
| **-15** | -24.51 |  | 306.122 |

Total of tube constant k = 247.532mm

Tube constant k average=

1. **Conclusion:**

Observing on the lab, we can see the effect of an electric field on the moment and deflection of electron. On the data, it shows the accelerate voltage relationship with the voltage of the deflection: deflected voltage is increasing and the deflection of electron is increasing too. Finally, the stronger electric field is a more active electron.