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Lab # 4

**Electron Gun – Effects of Magnetic Field**

1. **Objective**

To observe the effect of a magnetic field on the motion of electrons and to show relationship between the magnetic field stretch and deflection of electrons.

1. **Data/ Results:**

∆y: distance electron is deflected (mm)

x: voltage ratio (V)

k: tube constant (mm)

∆: acceleration voltage (V)

∆: deflection voltage (V)

=>x= => k=

Example: do trial data #1: ∆Va=, ∆y =20 mm,

x=

k=

Tube constant k average= = (mm)

**Data # 1: ∆Va=**

|  |  |  |  |
| --- | --- | --- | --- |
| **∆y(mm)** | **∆Vd(V)** | **x=** | **k=** |
| **20** | .996 |  | 324.14 |
| **16** | .803 |  | 321.93 |
| **12** | .551 |  | 351.90 |
| **8** | .318 |  | 406.09 |
| **4** | .062 |  | 1052.63 |
| **0** | -.176 | -.0111 | 0 |
| **-4** | -.418 |  | 154.44 |
| **-8** | -.682 |  | 189.57 |
| **-12** | -.924 |  | 209.42 |
| **-16** | -1.16 |  | 222.53 |
| **-20** | -1.37 |  | 236.12 |

Total of tube constant k = 3468.77mm

Tube constant k average=

**Data # 2: ∆Va=**

|  |  |  |  |
| --- | --- | --- | --- |
| **∆y(mm)** | **∆Vd(V)** | **x=** | **k=(mm)** |
| **20** | 1.27 |  | 311.04 |
| **16** | 1.03 |  | 306.51 |
| **12** | .738 |  | 320.85 |
| **8** | .433 |  | 365.29 |
| **4** | .105 |  | 754.71 |
| **0** | -.192 | -.0097 | 0 |
| **-4** | -.493 |  | 160.64 |
| **-8** | -.804 |  | 196.56 |
| **-12** | -1.11 |  | 213.90 |
| **-16** | -1.41 |  | 223.46 |
| **-20** | -1.63 |  | 242.42 |

Total of tube constant k = 3105.38mm

Tube constant k average=

**Data # 3: ∆Va=**

|  |  |  |  |
| --- | --- | --- | --- |
| **∆y(mm)** | **∆Vd(V)** | **x=** | **k=** |
| **20** | 1.48 |  | 308.16 |
| **16** | 1.21 |  | 301.88 |
| **12** | .867 |  | 315.78 |
| **8** | .529 |  | 344.82 |
| **4** | .176 |  | 519.48 |
| **0** | -.202 | -.0088 | 0 |
| **-4** | -.539 |  | 169.49 |
| **-8** | -.906 |  | 201.51 |
| **-12** | -1.26 |  | 217.78 |
| **-16** | -1.62 |  | 224.71 |
| **-20** | -1.88 |  | 242.42 |

Total of tube constant k = 2846.03 mm

Tube constant k average=

1. **Conclusion:**

Observing on the lab, we can see the effect of an electric magnetic on the moment and deflection of electron. On the data, it is show 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 magnetic is the more active electron.