5. Experimental procedure

1) Before initial use, remove the four screws on the CRT window and remove the internal packing foams, and then restore the CRT window by tightening the four screws.

2) Turn the brightness knob counter-clockwise to the end, set low voltage switch (LV Source) at "off" position, and turn on power. The indicator should turngreen and preheat the apparatus for 5 minutes. Now turn the brightness knob to set proper brightness (do not set high brightness!).A bright strip of roughly 3 cm in length will show on the screen.

3) Adjust the acceleration voltage to 1000 ~ 1100 V while adjusting the focusing knob to focus the bright strip.

4) Turn the current gain knob counter-clockwise to the end, set the current change-over switch at "1.5 A" range, and turn the low voltage power on. Now, the helix tube is energized and the bright strip on the screen will rotate by an angle with a decrease in length.

5) Turn the current gain knob slowly in clockwise directly to increase the current through the helix tube while monitoring the current reading on the ammeter. The bright strip will continuously turn and get shorter and shorter in length until it becomes a spot when the current increases to 1 A, indicating that electrons undertakeboth circular movement andlinear movement in B direction, and are focused to a point after traveling a distance of$h$ (l). The readings now are called current I_1, and acceleration voltage$U$.

6) Turn the current gain knob counter-clockwise to the end, and set the current change-over switch at "2.5 A" range. Now the bright spot on the screen gets longer in length.Turn the current gain knob slowly to increase the current and the bright strip will get shorter and shorter in length. When the current is increased to about 2A, the bright strip becomes a spot. This is the secondary focusing point with the current called I_2. A mean current value as $I=(I_1+I_2)/3$may be used in equation (12) to calculate the value of e/min comparison to the well-known value of $e/m=1.759\times10^{11}$ C/kg.

Note: the current direction is set by the current POLARITY switch. The experimental result may differ between the two current directions.

Caution: <u>to extend the lifetime of the instrument, do not applylarge current or voltage to the instrument for a long period of time.</u>

7) Press the current POLARITY switch to another direction, repeat the above procedures, and observe the bright strip changes (now the current through the helix tube is reversed and the turning direction of the bright strip on screen is also reversed).
To calculate e/m value more accurately, external voltmeter and ammeter of higher accuracy should be used in connection with the terminals on the front panel.
Warning: <u>avoid touching the metal terminals or pins with high voltage marks in the presence of high-voltage.</u>