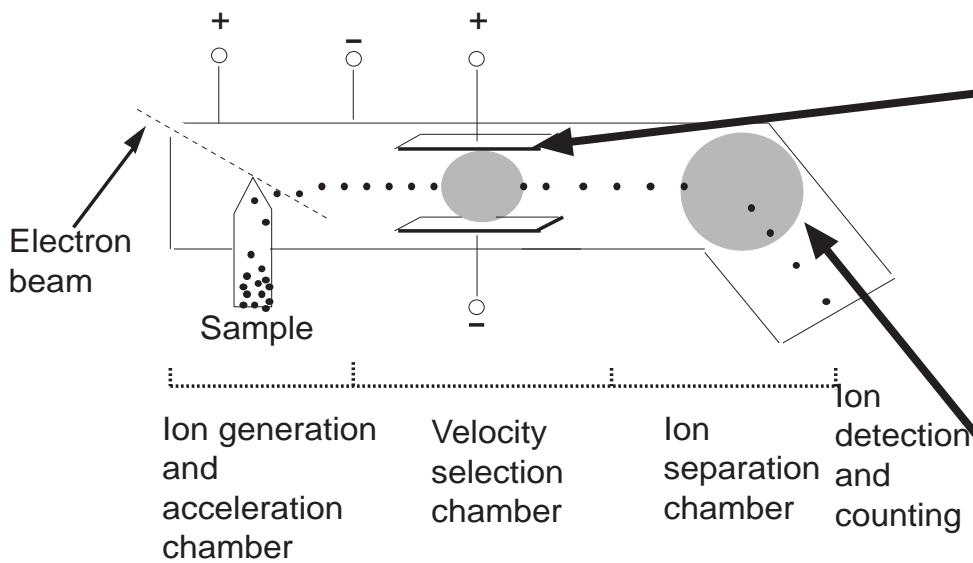


BAINNBRIDGE MASS SPECTROMETER



$$F_m = F_B$$

$$B_1 q v = E q$$

$$v = \frac{E}{B_1}$$

$$F_m = F_c$$

$$B_2 q v = \frac{m v^2}{r}$$

$$r = \frac{v m}{B_2 q}$$

Velocity of the ions that make it through the velocity selector chamber without curving.

The selector field uses opposing magnetic and electric fields to select specific velocities. If the ions are too fast the magnetic force will be greater than the force from the electric field and the ion will curve up. If the ion's velocity is too slow the magnetic field will be too weak and the ion will curve down. However, if the ion's velocity is just right so the force from the E field and the opposite B field are in balance, the ion will pass straight through the selector field and selection gate and then enter the second B field.

Radius of curvature.

The ions travel in a circular path dependent on the balance between the magnetic (force centripetal) and the ions mass inertia

When we combine the two together by substituting the velocity from the first equation, which was equal to E/B, into the second as show below. From this we can determine the radius in one step or even a charge to mass ratio.

$$r = \frac{\frac{E}{B_1} m}{B_2 q}$$

$$r = \frac{E m}{B_1 B_2 q}$$