

Thomson's explanation of the experimental results:

Experiment 1: The cathode rays are negatively charged so they should be deflected by electrostatic forces, and when exposed to this force they were deflected.

Experiment 2: The cathode rays are negatively charged so they should be deflected by magnetic force in a way that shows that they're negative, and they were deflected that way.

Experiment 3: The charge to mass ratio that he found suggested that the particle was thousands of times smaller than a hydrogen atom. By running the third experiment, Thomson was able to determine e/m , which is the mass to charge ratio of a particle.

The significance of Thomson's "discovery" of the electron:

Quantum theory and quantum mechanics requires knowledge about the electron.

Due to Thomson's "discovery" of the electron, Einstein was able to study the photoelectric effect, which deals with the release of electrons, and was able to propose a thesis about the quantum theory of light.

In the area of wave mechanics, the doctoral thesis of Louis deBroglie was able to explain particle-wave duality for light with respect to electrons.