Planck's constant and the photoelectric effect

In 1900, Max Planck proposed a radical new formulation of radiative energy, based on the concept of discrete energy quanta. This was a qualitative leap forward in physics, and it led to the development of quantum mechanics.

Planck's constant, $h$, is a fundamental constant in physics, with the unit of joule seconds ($J\cdot s$).

The photoelectric effect is a phenomenon observed when light is incident on a metal surface. The electrons emitted from the metal have a maximum kinetic energy that depends on the frequency of the light.

Planck's equation, $E = hf$, relates the energy of a photon to its frequency.

What was special about this experiment?

1. The experiment was performed by Heinrich Hertz.
2. The source of light was a spark discharge.
3. The photoelectric effect was observed.
4. The stopping potential was measured.

The conventional model of the cathode-ray tube assumed that the electrons were emitted from the cathode with a constant energy and further accelerated by the electric field. However, the experimental results showed that the maximum kinetic energy of the electrons was proportional to the frequency of the incident light, not to the intensity of the light.

The equation $E = hf$ was derived by Max Planck to explain the results of the experiment, where $h$ is Planck's constant.

The equation $E = hf$ is a cornerstone of the theory of the photoelectric effect.

The stopping potential is the potential difference necessary to stop the photoelectrons.

The stopping potential is given by the equation $E_p = E_{max}/e$, where $E_{max}$ is the maximum energy of the photoelectrons.

Planck's constant, $h$, is a fundamental constant in physics, with the unit of joule seconds ($J\cdot s$).