The Photoelectric Effect

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The emission of high energy electrons by metals caused by the absorption of light of appropriate wavelengths.

Evidence identifying the quantum explanation as more superior:

Einstein noticed that the experimental data based on the photoelectric effect conflicted with the predictions made by using classical mechanics. He was trying to propose that Planck was onto something when he used quantum to explain blackbody radiation. By using Planck’s idea that you cannot integrate, but must use discrete sums, Einstein was able to come up with an explanation of why electrons were emitted from the surfaces of some metals only when the metal was struck by photons of light with enough energy to dislodge the electron. Ultimately, Einstein was trying to prove that Planck’s quantum theory did have credibility and that the scientific world should not criticize his work.

In 1905, the way Einstein set up the experiment was to place a metal surface inside an evacuated chamber along with a positive terminal. He connected the positive terminal to a voltage source and attached the voltage source to a current meter. The current meter was then reconnected to the metal surface. Einstein’s plan was to shine light of varying frequencies and intensities on the metal surface to see if a current would be produced. If a current is indeed detected, he could identify the specific conditions in which the metal would emit electrons from its surface. The expectation of Einstein was for electrons to dislodge only when certain frequencies of light were shone on the metal.