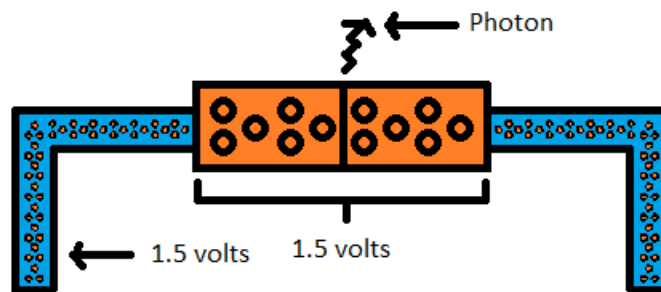


Conservative and non-conservative energy systems in LED's and diodes

There are two types of energy systems in LED's. The first is the conversion of electrical current and voltage into thermal energy through resistance heating. The second is the conversion of electrical energy into visible light. Both of these energy systems exist at the same time, in contradiction to traditional conservation of energy. There is also a third type of system that allows both of these to be produced using no electrical current. This is a non-conservative system, although the production of both light and heat from the same electrical current is also a conservation violation.

The image below shows these electrical energy systems:

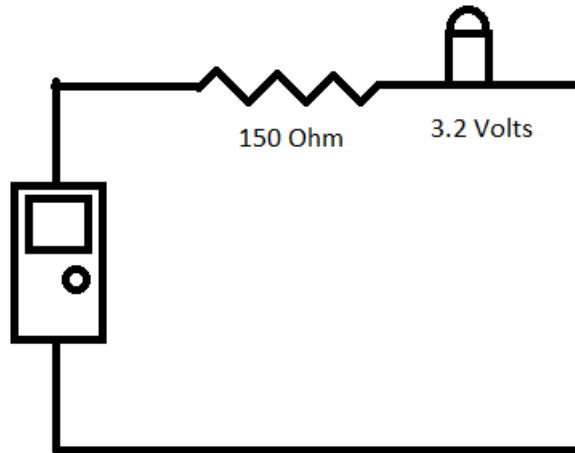


As you can see, the input voltage carries 1.5 volts, but the wire carries only a fraction of that since the majority of the 1.5 volts is dropped across the diode. In a conservative energy system, an input voltage that is higher than 1.5 volts would cause some current to flow across the diode. This current would cause power heating in the diode, because it has to cross across the entire diode before it reaches the boundary layer, where the photons are emitted. In this case each system is conservative, but both systems happening at the same time, and in the same amounts, is not.

In addition, a third energy system called "static kinetic energy" forms in the system shown above. This occurs when the diode and input voltages are matched, preventing current from flowing, but allowing two "pools" of active kinetic energy to form in both the diode and input wire. Both carry kinetic energy, experience power heating, and emit photons at the boundary layer, but no current flows. This is a fully non-conservative energy system.

To show these results, an experiment was done to show that these systems exist and that the LED functions as expected.

The experiment setup is shown below:



The experiment was run twice with the DC power supply at 3.2 volts. No current was observed flowing from the DC power supply. When a current meter was placed in the series circuit with the diode, .5 milliamps was shown to be flowing, which is a small fraction of the 20 milliamps made available to the diode and which was needed to fully light the LED. With this setup, the LED was indeed fully light.