I’m interested in the idea studying the phenomena of light emitting diodes. I realized that I’ve known of these LED’s my whole life, from Christmas lights to Nobel Prize winners, but I don’t actually have any idea how they work, or why they are important. I figured I could do a project on the theory and mechanics behind why LED’s are supposedly an amazing invention.

The general design of a led is to create light through by electroluminescence in a semiconductor material. electroluminescence is the natural phenomena where light is emitted from a metal, either through and induced electric field or through a current. The Led uses two types of semiconductors to essentially force this phenomenon to emit light indefinitely. Thus, we have light in the form of an LED.

The benefits of this technology have already been well documented. Mainly the fact that LED’s are much more energy efficient than their traditional counterparts. They are also more durable than most other common light sources. However, they are not perfect. Led’s main drawback is that they require the use of semiconductors and rare earth materials. Although we current are able to keep up with demand, there’s a limited supply of resources needed so we could see leds fall out of use as the price to make them increases.

**Papers-**

LED light sources (light for the future)

N Grandjean

Journal of Physics D: Applied Physics, Volume 43, Number 35

White light emitting diodes with super-high luminous efficacy

Yukio Narukawa, Masatsugu Ichikawa, Daisuke Sanga, Masahiko Sano and Takashi Mukai

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Journal of Physics D: Applied Physics, Volume 43, Number 35

Improvement of efficiency droop in InGaN/GaN multiple quantum well light-emitting diodes with trapezoidal wells

Sang-Heon Han1,2, Dong-Yul Lee2, Hyun-Wook Shim2, Gwon-Chul Kim2, Young Sun Kim2, Sung-Tae Kim2, Sang-Jun Lee1, Chu-Young Cho1 and Seong-Ju Park1,3,4

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LEDs for lighting: Basic physics and prospects for energy savings

Bruno Gayral