Notes from work experience day 2

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1. The voltage over an LED

1.1. The experiment

Continuing on from yesterdays study of The wavelength of LEDs and how it change as the current was increased, today I have taken results showing how time effects the voltage across the LED.

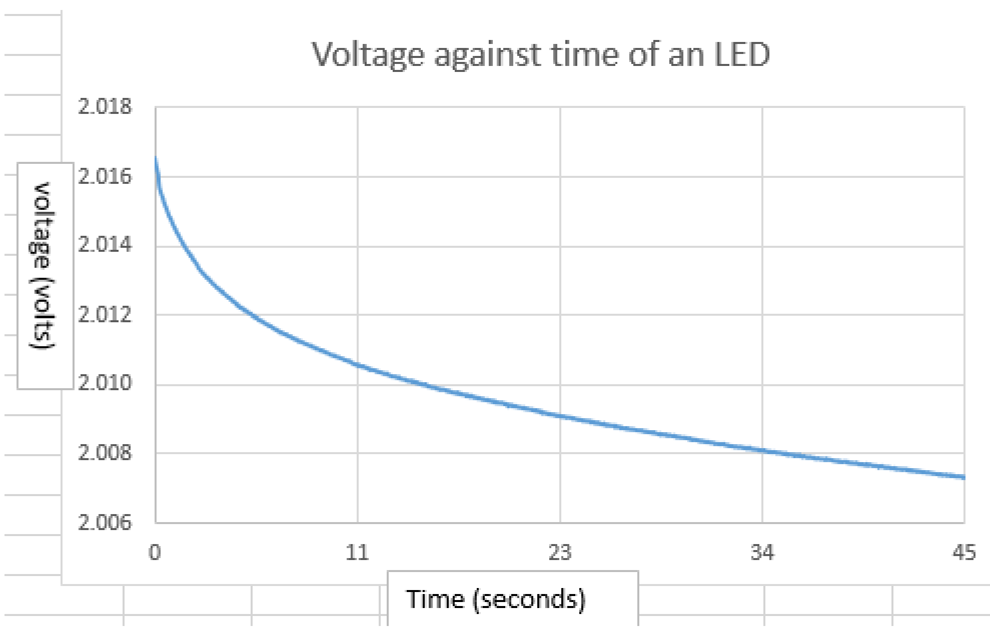
I would predict that the LED's voltage will fall over time as the temperature increases, which will cause the die to "slow down" so to say, or stop behaving as once intended.

My results were taken on a green LED with a 10mA current provided at 2.2V. A multimeter was used to capture data from the LED, it takes 2000 readings and outputs them in a csv file (my results can be found in results.csv).

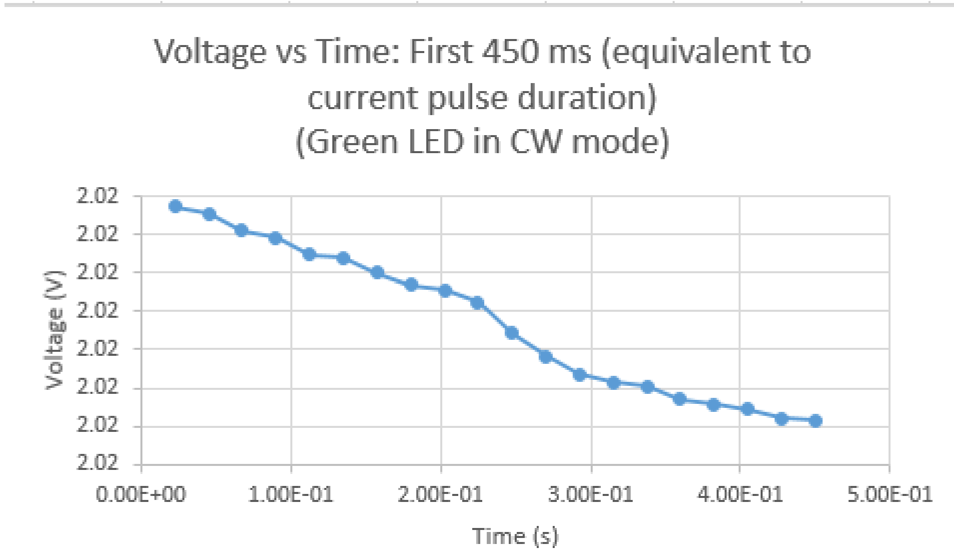
I found it took on average 45 seconds for the multimeter to take 2000 results. The data was taken at 1 nplc (1 nplc = 1/50hz)

1.2. Results

As expected the voltage over the LED fell slightly over time, the graph of these results can be seen bellow.



Another graph showing the first 450ms can be seen here, this relates to how our pulse mesurements from yesterday



As you can see, this is experiencing exponential decay, falling quickly at first and then levelling out. This was about as expected. The voltage falls, as the LED is too hot, then it reaches closer and closer to equilibrium, where the total thermal output is the same as the power input.

1.3. Takeaways

From my data I can take away that LED's are definitely thermally limited, one can see this from today's data and yesterdays data. I have found it interesting how the LED can heat up so slightly and yet it still have an effect on the voltage input. One would suppose there is a formula to model this decay in voltage.