CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
James Noraky

Project Number
J0727

Project Title
Dynamic Diffractions: The Effect of Laser Light on Storage Capacity

Abstract

Objectives/Goals
The goal of this experiment is to determine the capacity difference between various medias (CDs and DVDs) when created with different lasers. Another objective is to view the differences between Burnt Media, CDs or DVDs created with a piece of Computer Hardware called a Burner, and Pressed Media, store purchased CDs or DVDs created using a press. In addition to the comparison of the Burnt and Pressed Medias capacity, the incident point's shape is compared and analyzed.

Methods/Materials
The experiment is to be conducted by creating an apparatus that would mimic another apparatus, Diffraction Grating. To get around actually creating a Media with the different lasers, the measurements obtained from the appartus will be interpretted by an equation and estimate the capacity of the Media. This way actually creating the media will not be necessary when the difference of capacities is important.

Using a support, preferably a box, a thin sheet will cover it and act as the area onto which the laser reflects onto. Using a stand to hold a laser still, the laser shall shine onto a hole punched specifically the size of the laser tip. Underneath it all, a media shall be placed [Note: The elevation on which the laser is above the media shall be kept constant] and when pressed the distance between the incident and other points shall be measured.

Results
The results show that:
* The distance between the incident and the refracted points is greater for lasers with a shorter wavelength
* The bits per nm^2 is greater with lasers with the shorter wavelengths than the longer wavelengths for all medias tested
* Burnt and Pressed Medias have about the same capacity
* The estimated percent error is 10%

Conclusions/Discussion
From the analysis and research, it can be concluded that:
* The results show that the wavelength of the laser affects the capacity of the media (CD/DVD).
* These results are interesting, since more media can be stored by just changing the laser beam (wavelength) used for reading the media.
* It also found that burnt CDs and DVDs did show similar bit size to the pressed CDs and DVDs which

Summary Statement
The focus of this project is to determine the capacity differences of various medias by "creating" them using different lasers.

Help Received
Kevin Tetz; Dr. Saidaine