



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Ryan O. Brottlund	Project Number J1505
Project Title How Do Different Color Filters Affect the Energy of a Laser Beam?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to find out how color filters would affect the energy of a laser beam. I thought a color filter with the same wavelength as a laser beam would block the most energy and I thought the laser beam energy would increase as the wavelength value of the color filter decreased.</p> <p>Methods/Materials A test fixture was built to hold the laser, color filter and solar cell. The energy of the laser was first measured without a color filter in millivolts for 3 seconds with the solar cell. I then placed a color filter in the test fixture. Lastly, I measured the energy of the laser with the color filter in millivolts for 3 seconds. I repeated the measurement process five times for each of 12 different color filters. A 645 nm red laser and a 532 nm green laser were tested using this procedure.</p> <p>Results The percent of laser beam energy passing through the color filters at laser wavelengths was 100% for the red laser and 80% for the green laser. With both lasers the 490 nm blue filter blocked the most energy. The green and red lasers reacted to the color filters producing varying results that were not what I predicted.</p> <p>Conclusions/Discussion I determined that both points of my hypothesis were not correct. I found out a color filter of the same wavelength as the laser beam did not block the most energy. I also found the energy did not decrease with color filter wavelength decreases. I determined the energy is partially dependent on wavelength but more dependent on the optical density of the color filters.</p>	
Summary Statement My project was on testing the affect of color filters on laser beam energy.	
Help Received My Father helped prepare the test fixture, edit my report, and paste up my display. My Grandfather made the frame for my display.	