California Science Center

CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.)
Jodi B. Nagelberg

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)
Lasers in Orbit

Science Fair Use Only

J1418

Division
X **Junior (6-8)** _ **Senior (9-12)**

Preferred Category (See page 5 for descriptions.)
14 - Physics & Astronomy

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)
Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.

Several atmospheric layers of different densities surround the Earth. In this research, the atmosphere is simulated using solutions of different densities. This projent sought to find the relationship between the incident angle theta, and the horizontal distance when coherent light travels through fluids of different densities. A laser beam was directed at different angles (incidence) towards the bottom of the graduated cylinder filled with layers of fluids of different densities. The horizontal distance is the distance from the normal to the points where the refracted laser light crossed the barriers of each layer of the fluids, and these distances were measured. Snell's Law was used to calculate these distances as well. A comparison was made between the measurements and the calculations. The results found that a correlation exists between the incident angle and the horizontal distance. If the optical densities and atmospheric depths are known, then a relationship can be established between the incident angle and the horizontal distance- the distances from the entry point in the atmosphere to the final location of the laser beam on the sufrace of the earth.

Summary Statement (In one sentence, state what your project is about.)
To determine a relationship between the incident angle theta, and the horizontal distance when coherent light travels through transparent media of different optical densities.

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.
Borrowed beaker, graduated cylinder, and ring stand from Viewpoint School. Cecilia Duenas, administrator at Santa Monica High School helped explain mathematical formulas and answer questions. Mr. Garcia, science teacher also helped explain information.