# CALIFORNIA STATE SCIENCE FAIR
## 2002 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**J1502**

**Project Title**
## Is It Possible for a Wave (or Particle) to Be in Two Places at the Same Time?

**Abstract**

**Objectives/Goals**
This project is to determine whether or not a photon can cause it's own interference, effectively being in two places at the same time.

**Methods/Materials**
Using two slits and a helium:neon laser, photos were obtained showing the interference patterns. The photos were analyzed. The laser was then attenuated using glass filters, and more photos were taken. These photos, and their data were compared, to reach a result.`

**Results**
Even when only one photon at a time was traveling through the slits, the interference patter of two photons at the same time appeared. Thoe photos appeared to show that two photons were where only one could possibly be.

**Conclusions/Discussion**
According to the data, it appeared that indeed, one photon could be in two places at the same time. By this, we can hypothesize that there is an entirely different set of physical rules at work in the quantum world.

**Summary Statement**
This project demonstrates that a quantum particle can be in two places at the same time.

**Help Received**
Borrowed equipment from UCI lab under supervision of father (Professor Apkarian)