

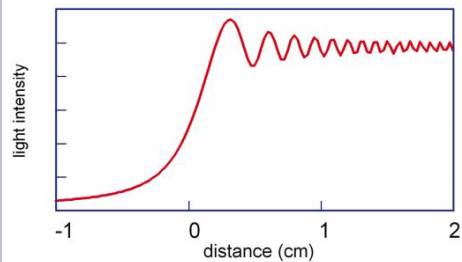
Optics

"We live in a world bathed in light. We see with light, plants draw energy from light, and light is at the core of technologies from computing to new surgical techniques. The field of optics concerns understanding and harnessing light."

Optical Science and Engineering for the 21st Century, National Research Council

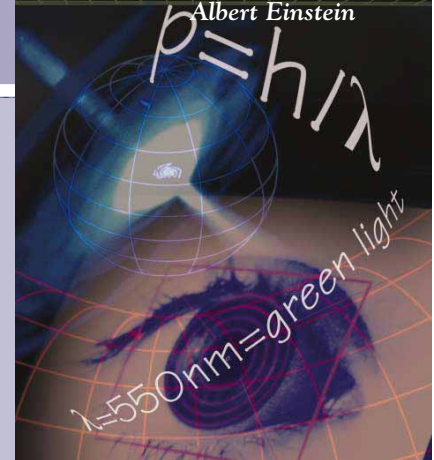
For centuries, light was thought to travel in straight rays like a projectile. However, scientific observation revealed light has wave properties. Careful examination of shadows, for example, reveals they are not geometrically sharp but are wonderfully complex interference patterns reminiscent of interference in water waves.

The graph plots the light intensity after an edge. Because light is a wave, the intensity behind the edge (distance < 0) is not zero and after the edge (distance > 0) an interference pattern develops.



"Every physicist thinks he knows what a photon is...I spent my life to find out what a photon is and I still do not know."

Albert Einstein



Vertical cavity surface emitting lasers hold great promise for high-speed data communication applications. These lasers are being developed by companies such as W.L.Gore.

Digital imaging is a revolution. Millions of small charge-coupled-devices (CCD) in arrays on computer chips convert light into an electrical signal that can be easily stored. When the stored data is read back the original image is recreated. CCD chips in digital cameras have replaced the photographic film.

CCD chips used in the Hubble Space Telescope capture stunning images of the heavens. The Hubble Space Telescope is shown here being lofted from the Shuttle into the black of space.



Optics is a key to economic growth in the first half of the 21st century. The areas involved with advancing optical technology include health care, national defense, information technology, optical sensing and optics research. In the future, almost all communication will be transmitted by light in fiber optics.

Research at the University of Delaware includes the development of new opto-electronic technology. Dan Dakin (BS '01) is shown adjusting a mirror in the high power laser he designed. The laser delivers pulses of light with a peak power of 5 trillion watts!

Atomic, Molecular, Optical Physics
Barry Walker Research Group
Travis Mitchell Research Group
George Watson Research Group

