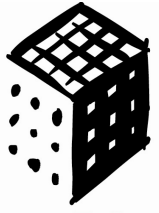
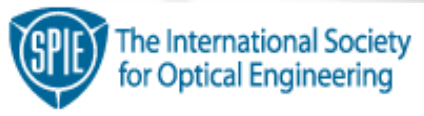


The OPTRICKS Suitcase

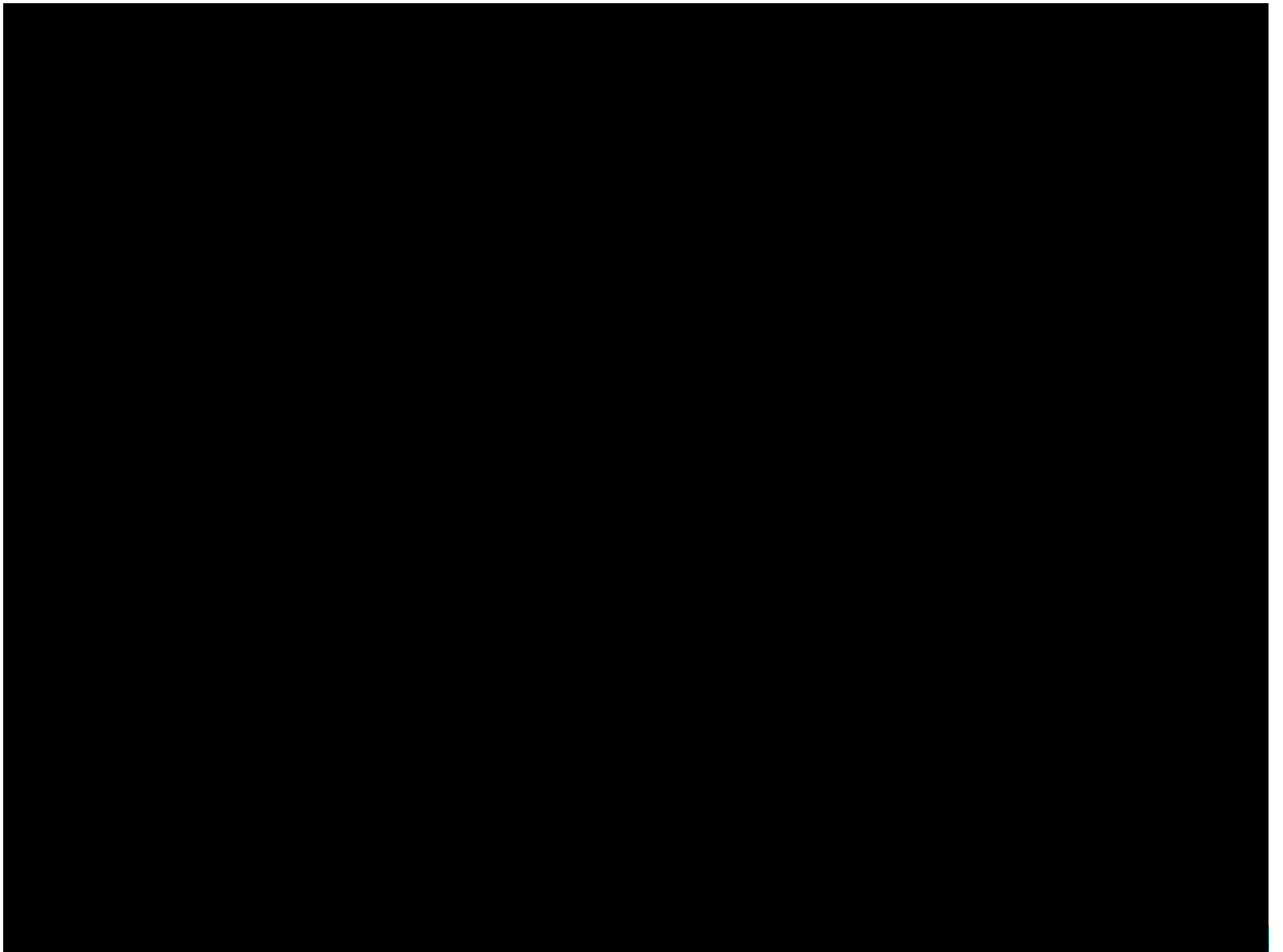
Optics is Light Work!!



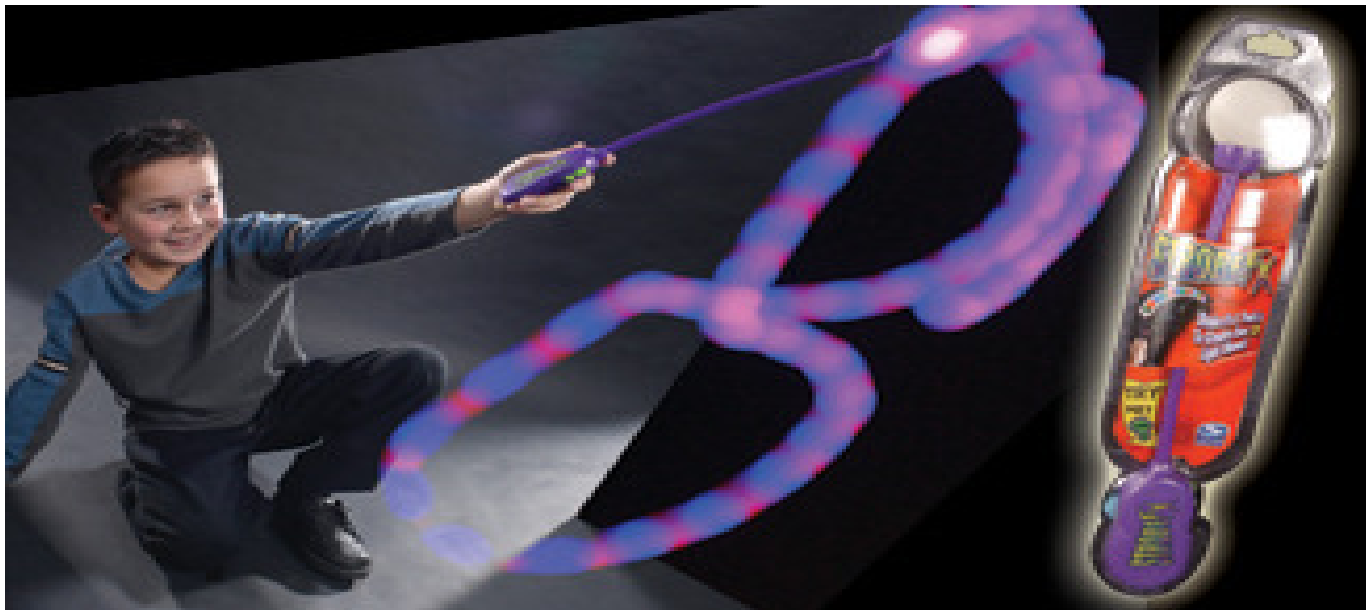
Dr. Murty
The Wizard of Light







Strobe FX



<http://www.spinmaster.com/docs/comm/StrobeFX.mov>

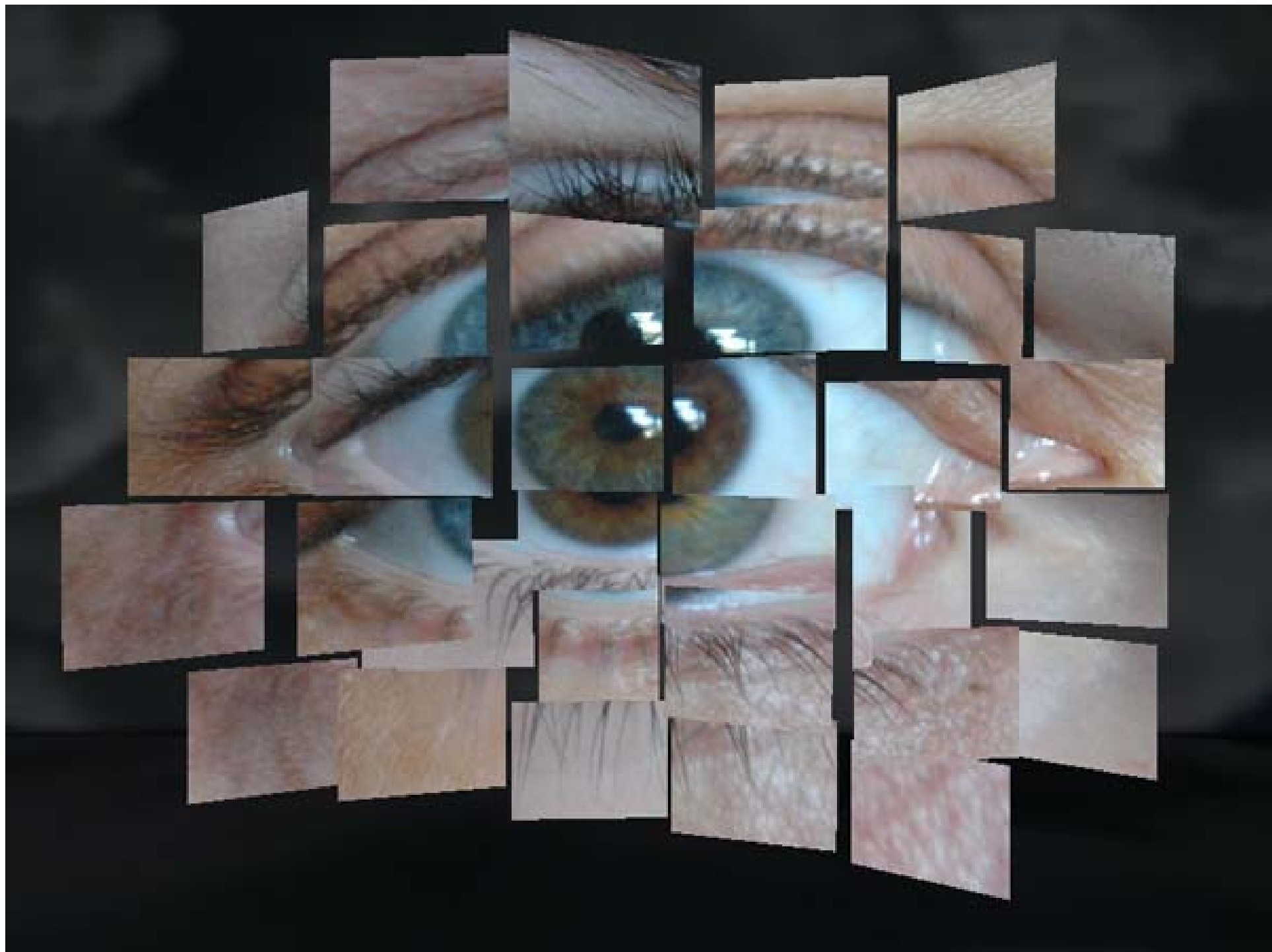
The X-Light

Colors moving in Space-Time



Part I – How Do We “See” the World Around Us?

'Frissonnant le monde!'



EyeBall Optics

Anatomy of the Human Eye

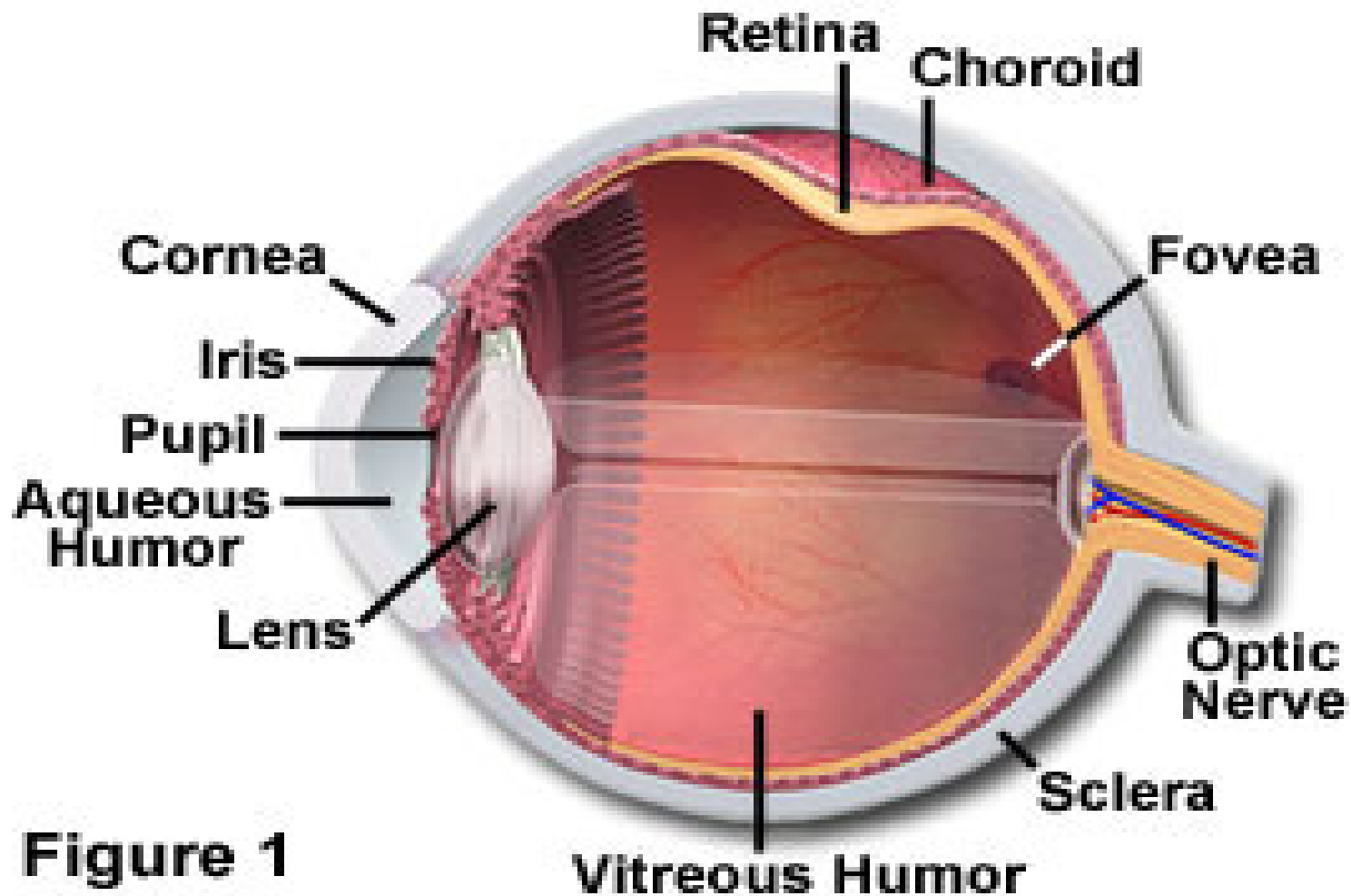
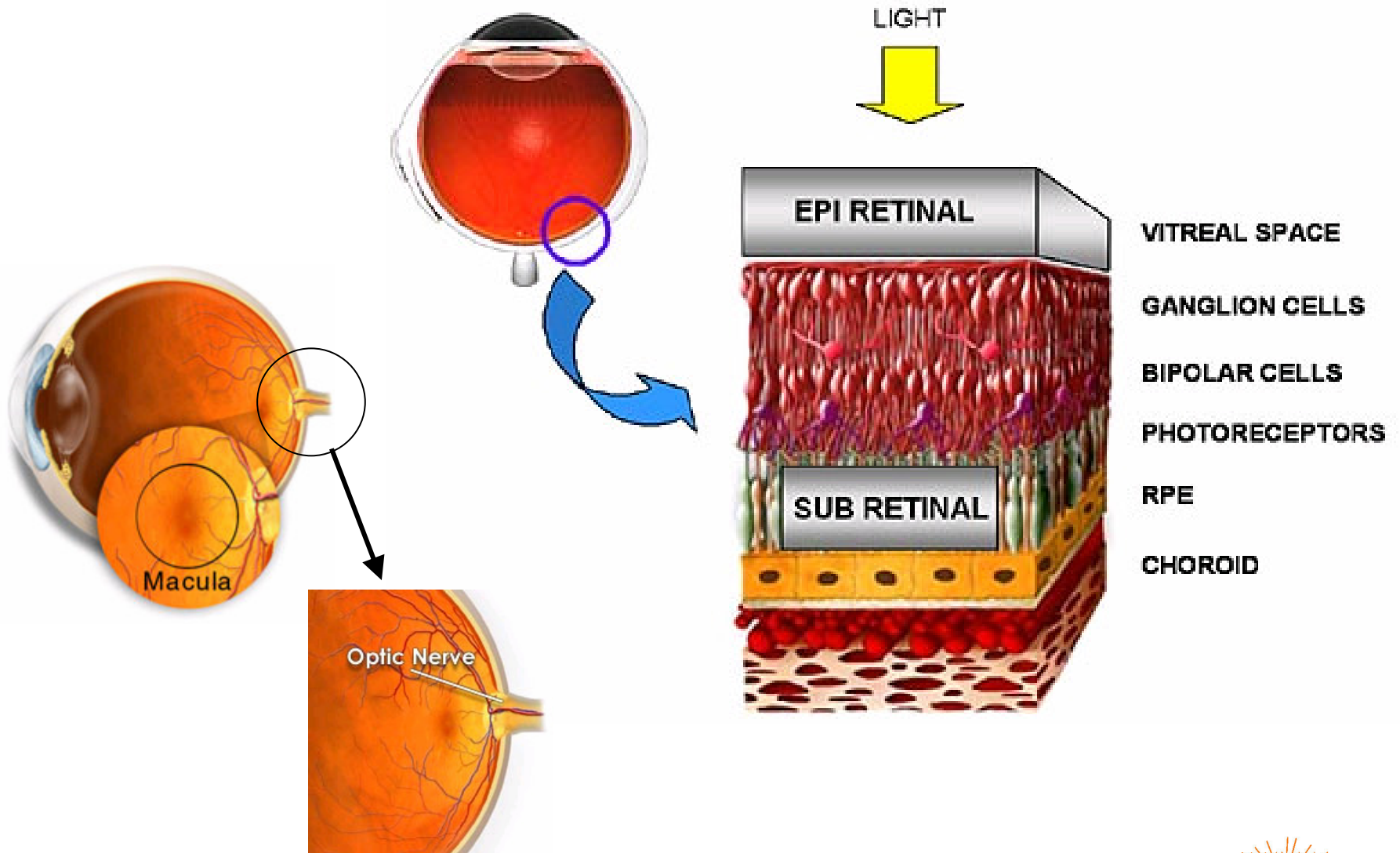
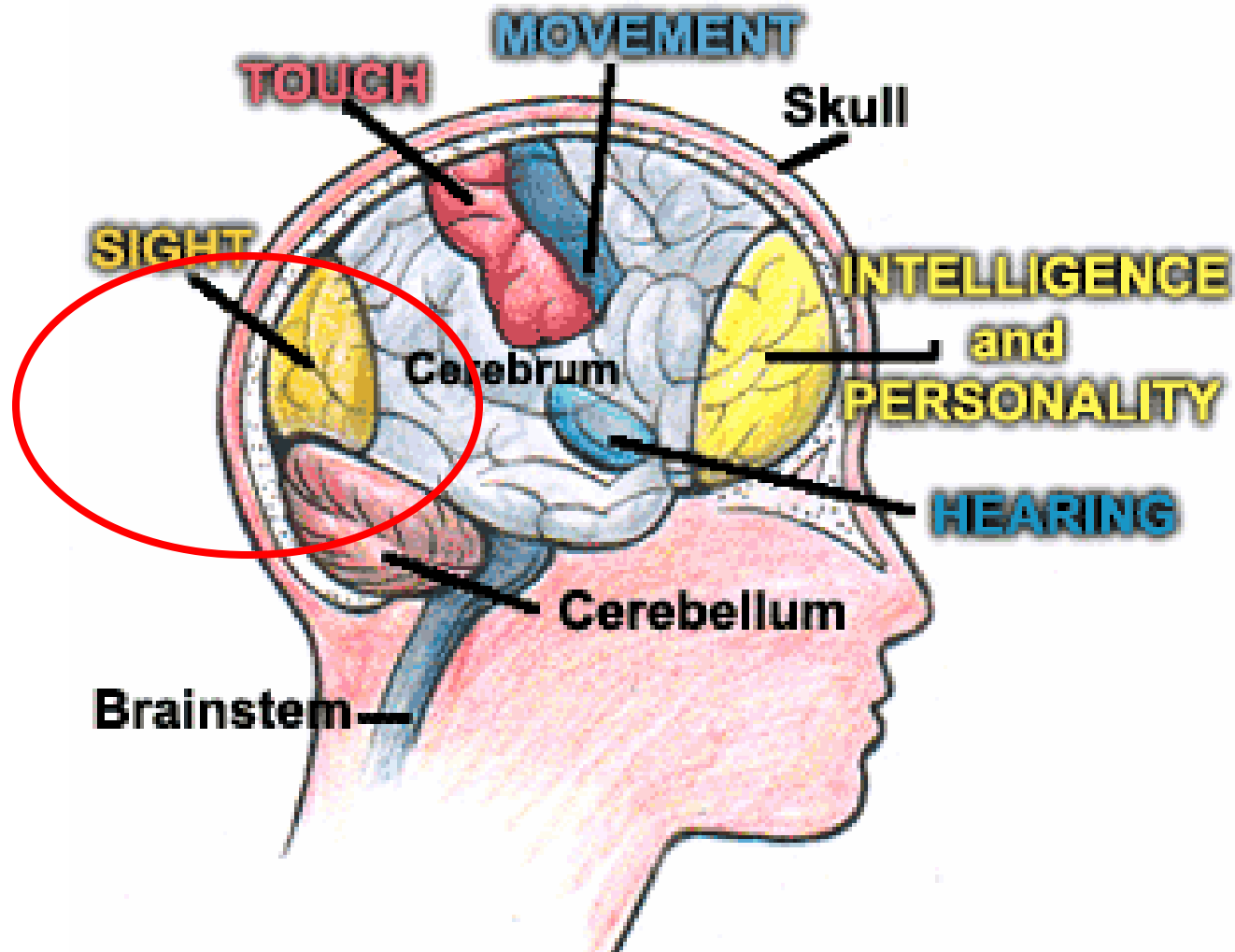


Figure 1

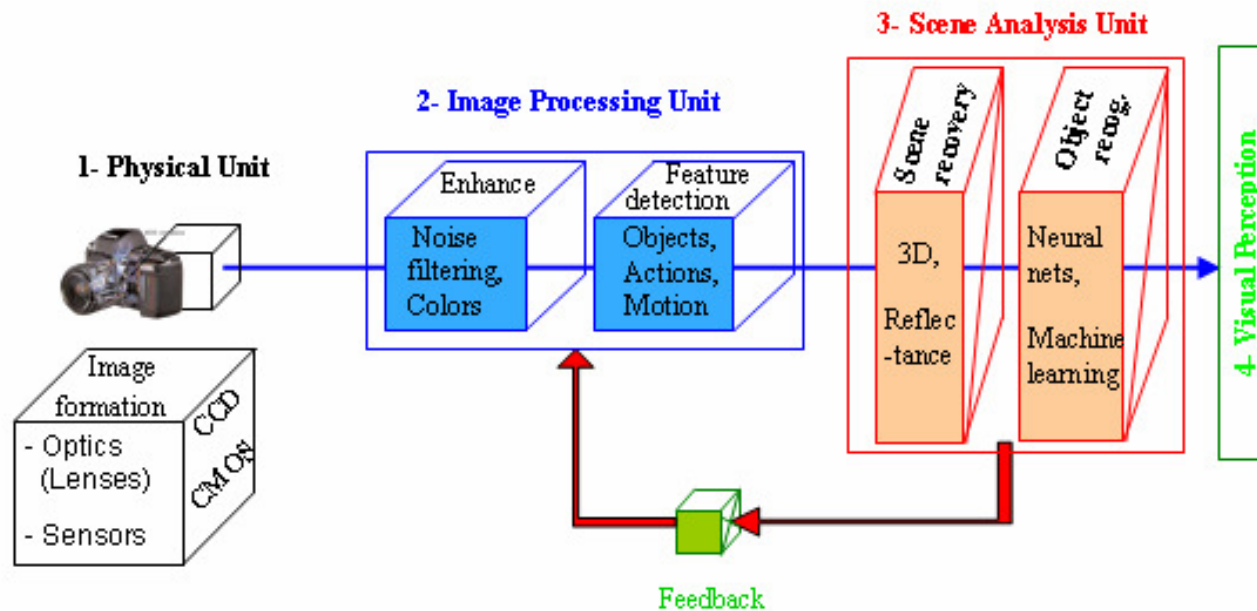
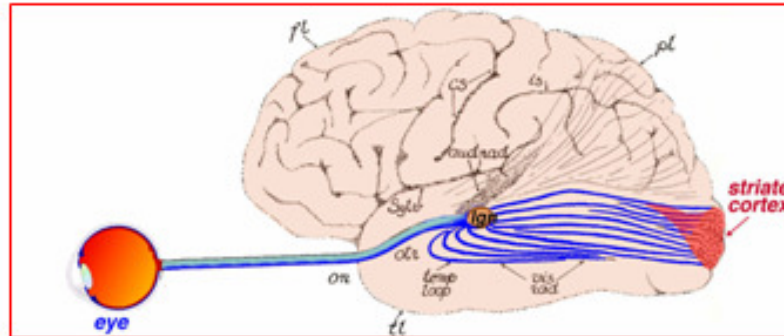
The Retina as a Detector



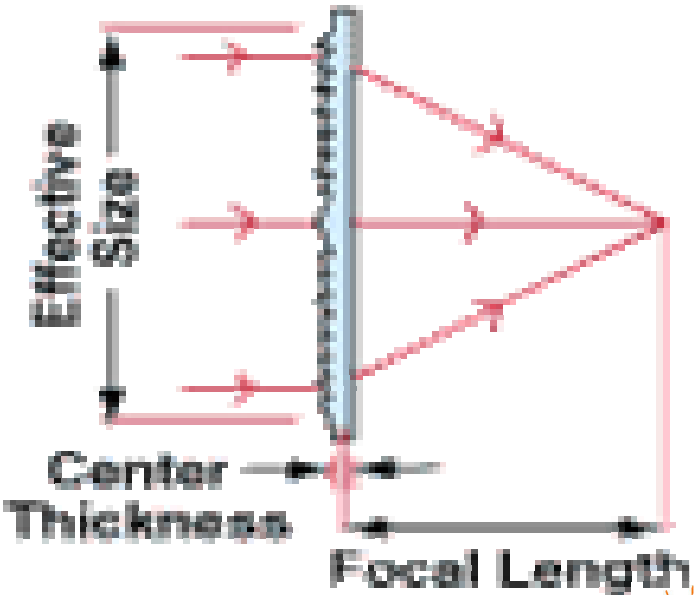
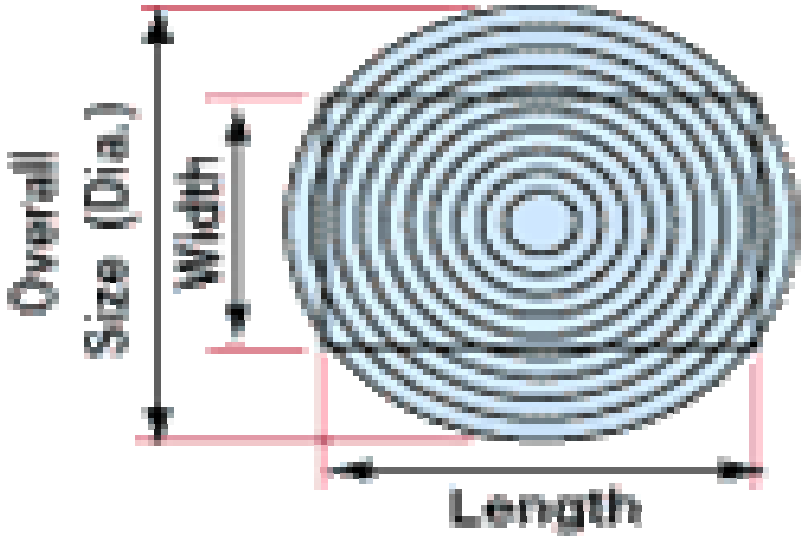
The Brain as a Computer



Part II – How Do We “Interpret” the World we “See” Around Us?

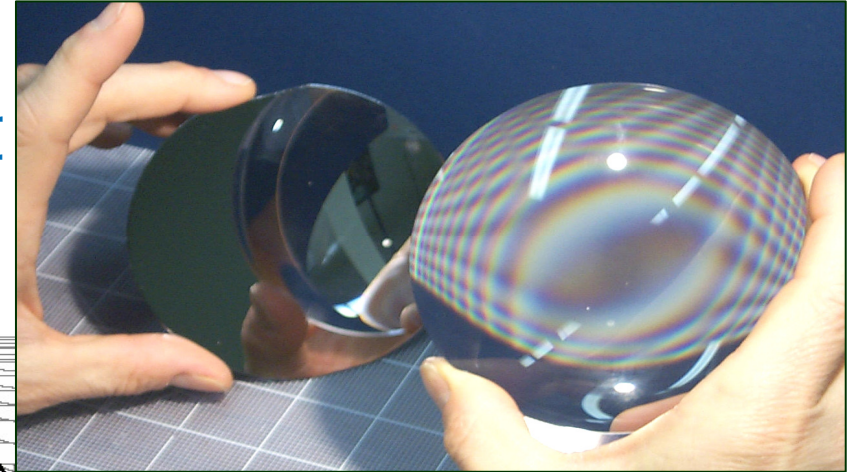


What's a Fresnel Lens Anyway?



Optical Engineers Work with Materials That Reflect or Transmit Light

Si – polished silicon wafer mirror-like reflector



SiO₂ – clear silica lens focuses light

PERIODIC TABLE OF THE ELEMENTS

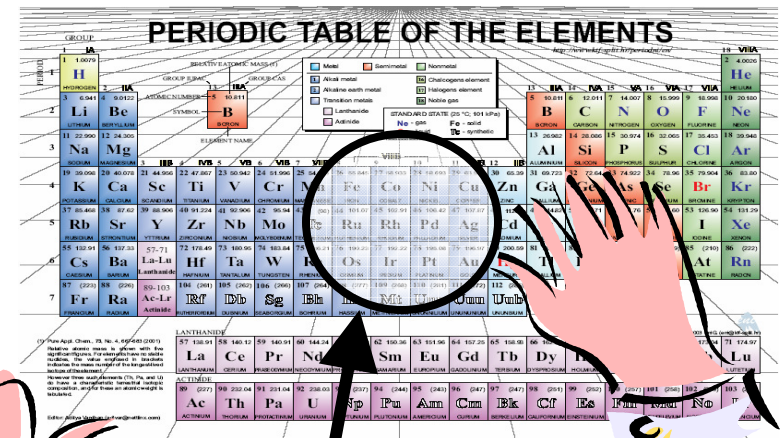
http://www.kent.edu/~hr/periodic/en

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Magic Dots

Most printed material is made up of lots of Dots!!

- Have you ever wondered how printing works?
- Most modern printers use lots of dots to make up the text & images that you see.
- Do you know what color ink they use?
- Use the small magnifying lens to look at the Periodic Table. Do you see the Magic Dots??

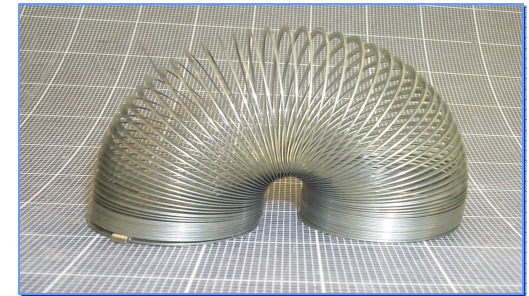
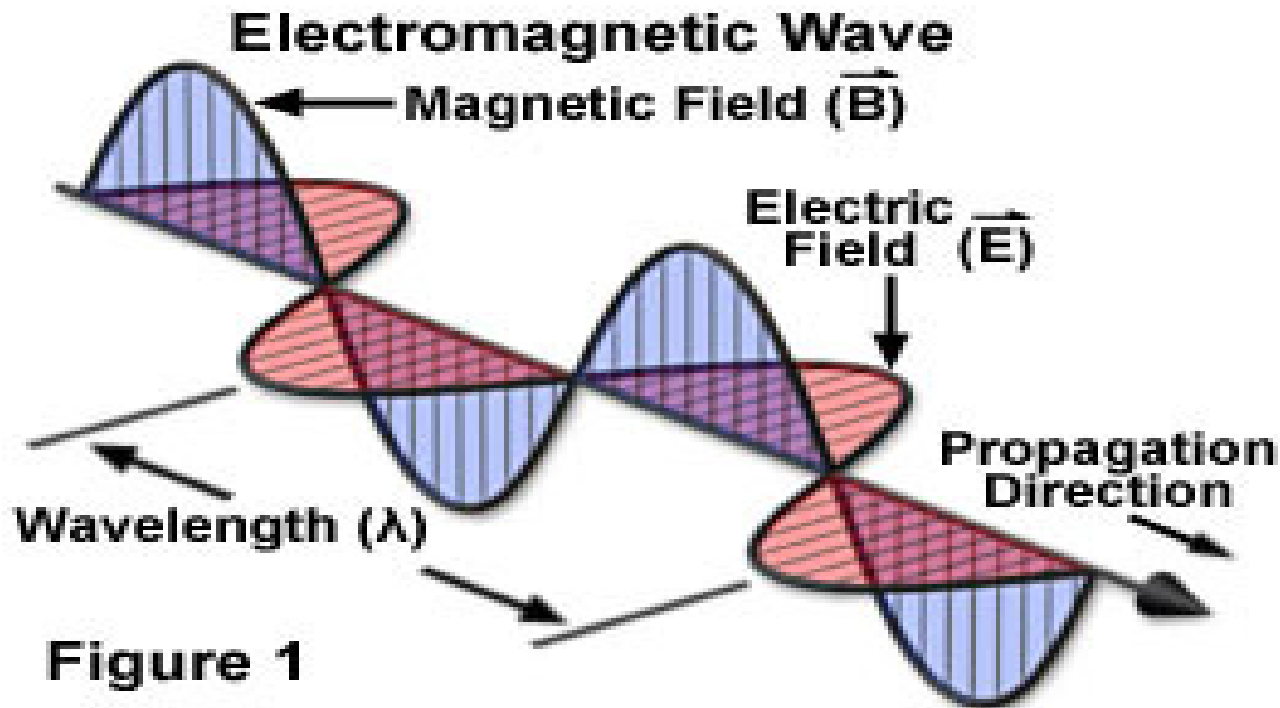


Small Magnifying Lens

Hold the lens about 1 inch above the paper.

What is Light??

Light is Like a Vibrating Wave

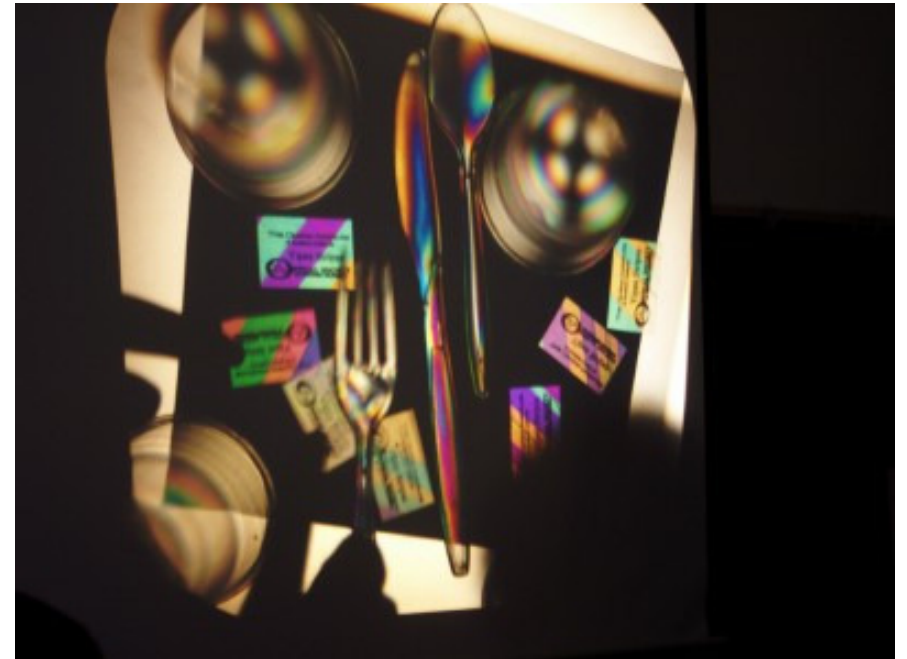


Slinky

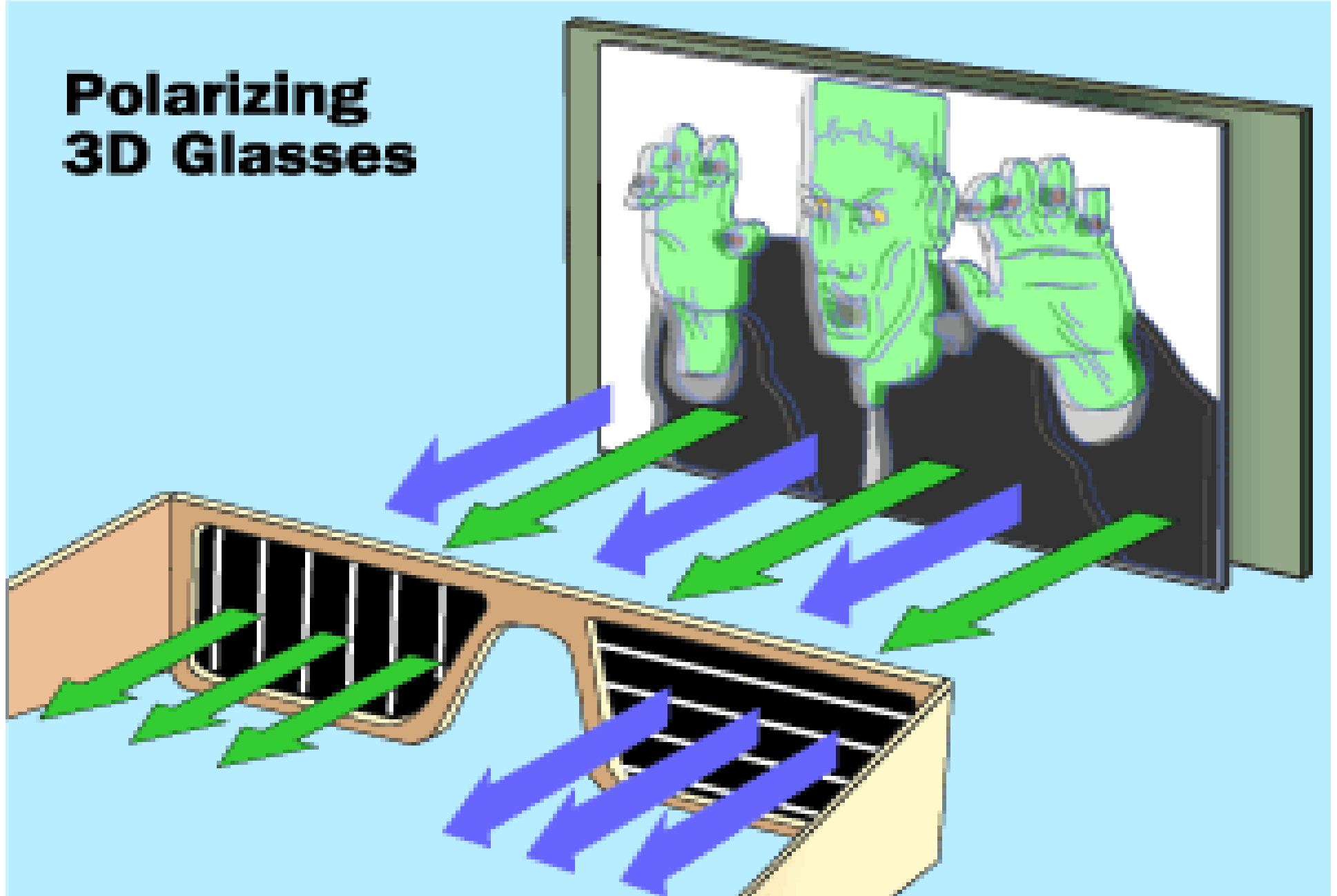
Figure 1

- Light is like pure energy with no rest mass (because it is never at rest!!)

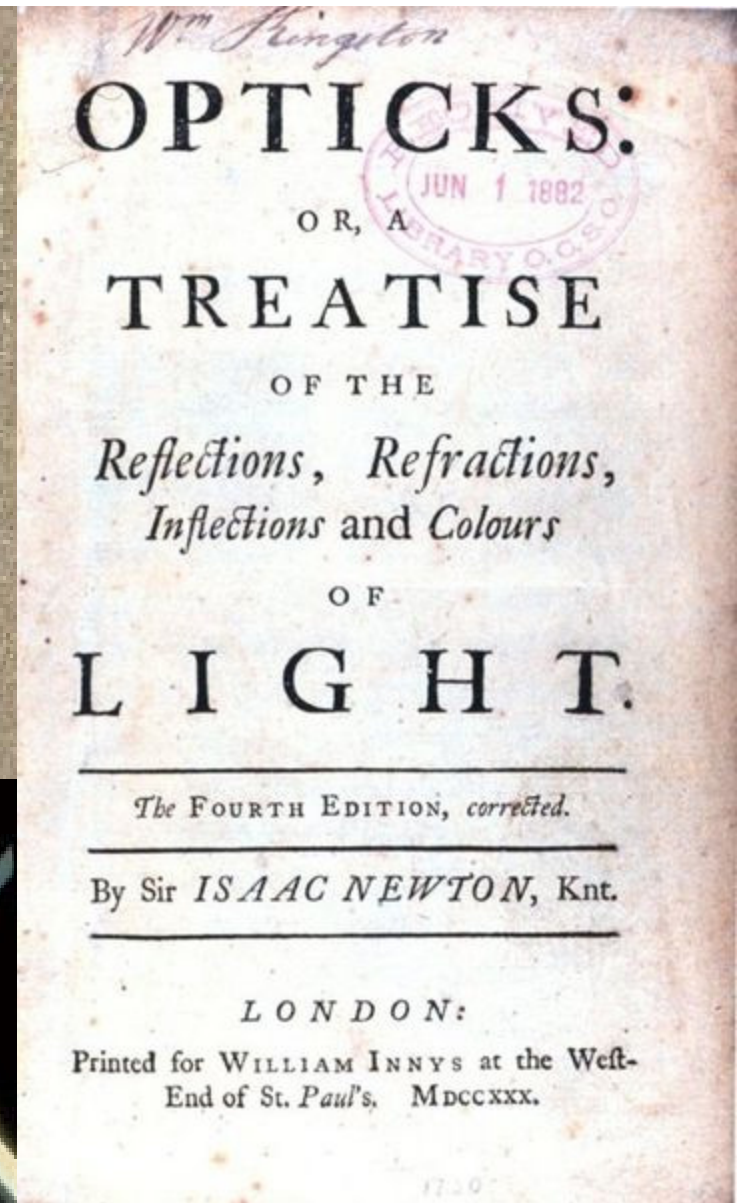
Magic Stripes - Polarization



Polarizing 3D Glasses



The polarized glasses allow only one of the images into each eye because each lens has a different polarization. Image courtesy of howstuffworks.com



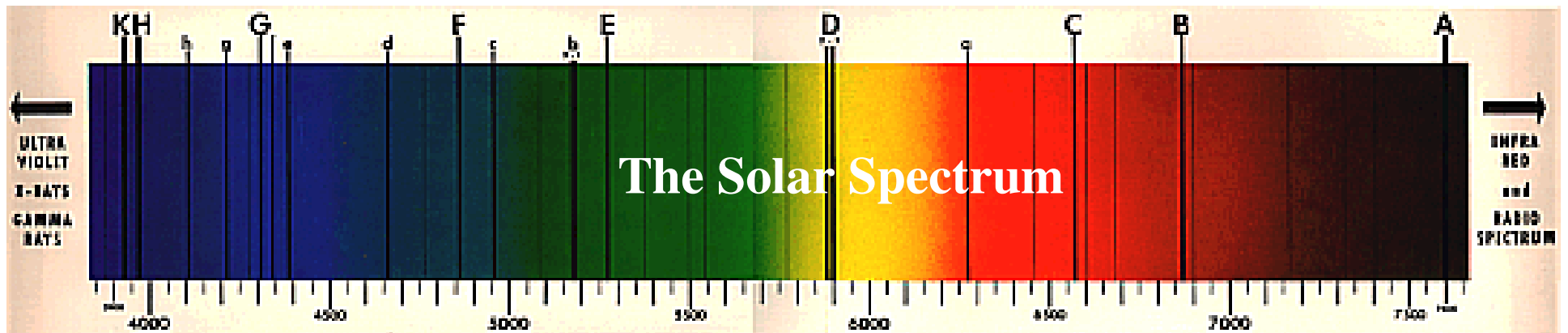
Rainbow Peephole®

Diffraction Gratings

- Light from the flashlight is “redirected” in passing through the plastic peephole to the eye.
- Where do the colors come from?
- Do you see a regular pattern?
- Identify the colors. Are they the same in each spot?
- Does the pattern change if the flashlight is close or far from the peephole? How?
- Do you see colors from other people's flashlights, even those far away from you?
- Do you see colors from the room lights?
- The regular array of bumps on the plastic peephole's surface allows us to see the color in white light through “diffraction.”



We can know what is in the light source by understanding the spectrum.



UV
X-Ray
Cosmic

Visible

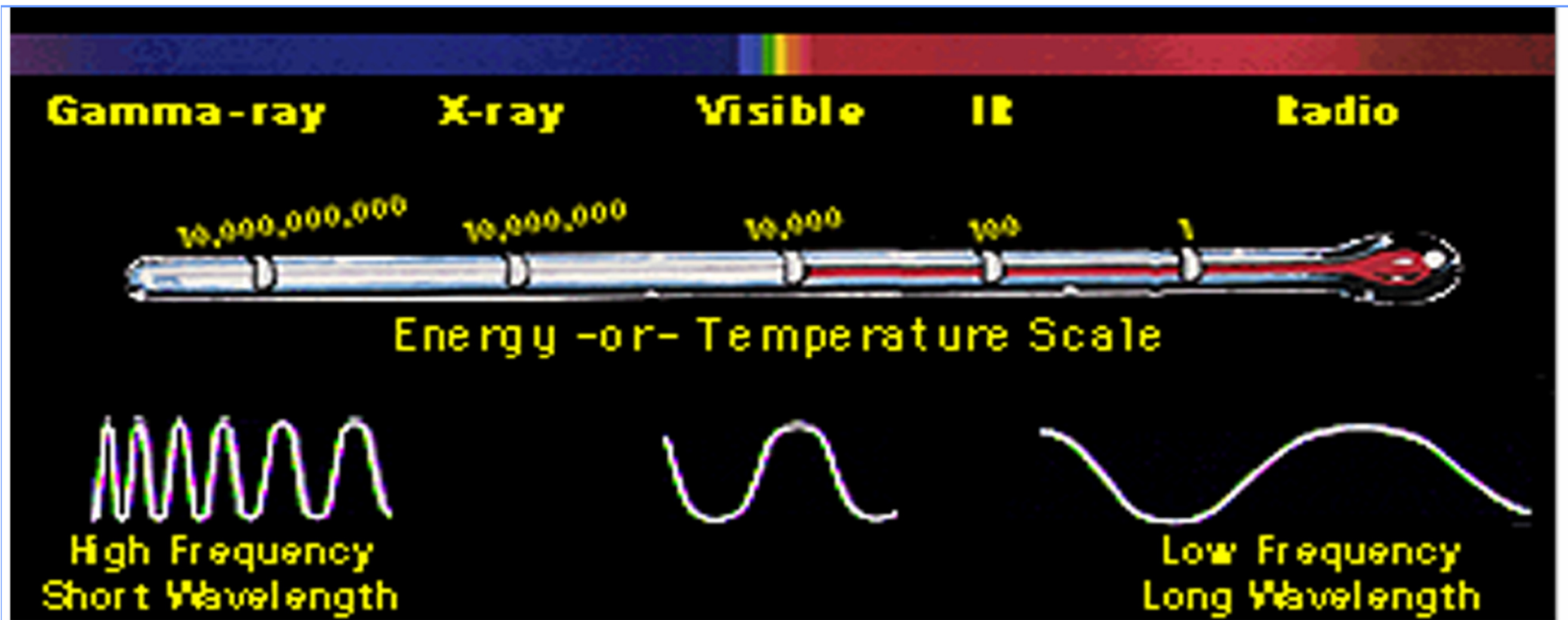
IR
Radio



The Optics Institute
Of Southern California



LIGHT - Electromagnetic Spectrum

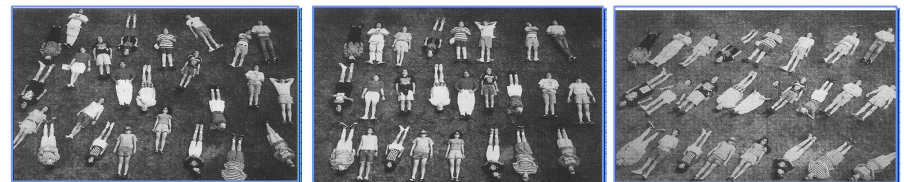


The electromagnetic spectrum. Radio has long wavelengths and low energies, while gamma rays have very short wavelengths and high energies.

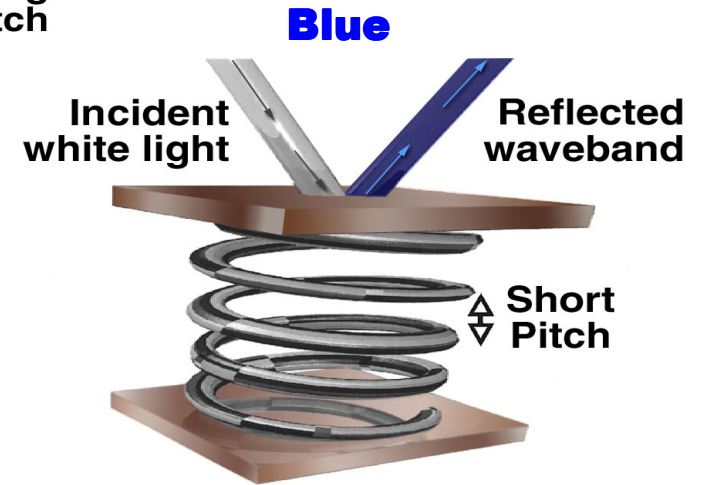
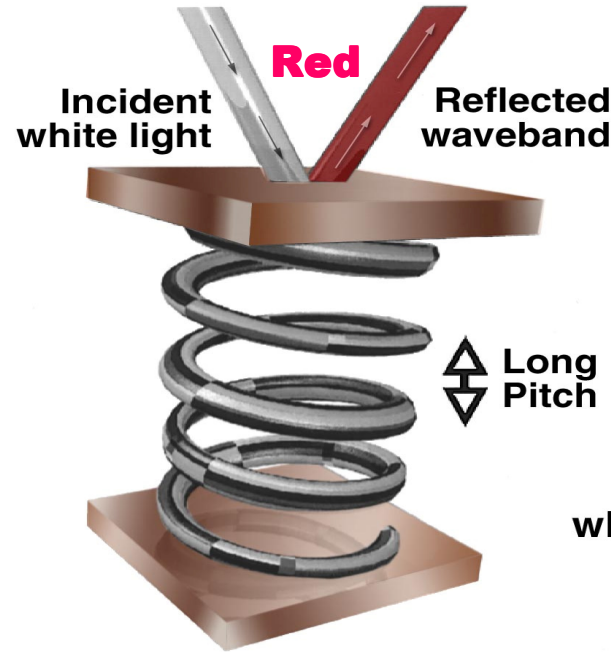
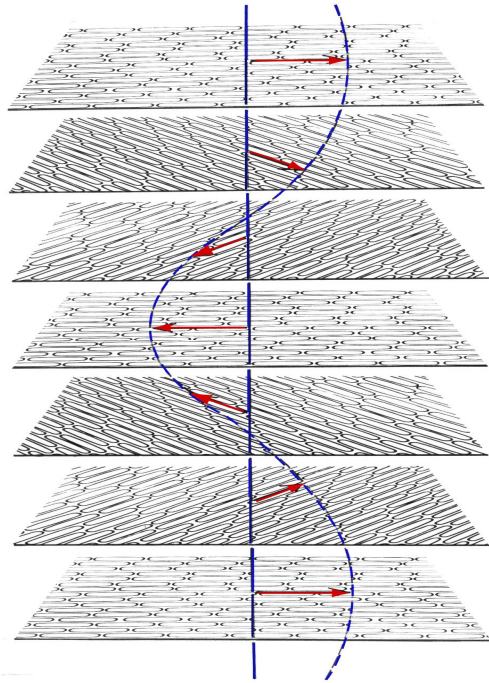
Magic Patch

(temperature data vs. color)

- Place the patch on your wrist and perform the “vampire test.”
- The “*Magic Patch*” changes color with the heat from your body. The “living dead” give off no heat!
- Where do the colors come from?
- Does anyone see a vein or artery?
- This is an example of “selective reflection” by liquid crystals, painted onto the black paper.
- Liquid crystal are “ordered,” just like the students across the page.
- Scientists use liquid crystals to build displays for watches and computer games.



Selective Reflection in Cholesteric Liquid Crystals



- Within each layer, molecules (students) align with long axes (bodies) parallel to plane of layer.
- Protruding side groups force molecules in adjacent layers to be displaced, creating a twisted, helical structure.

Interference

**Soap Bubble
Interference
Colors**



Figure 1

This is a whole other topic that is fascinating and exciting. Come have more fun....

Bubblefest XII



March 15 - April 6, 2008



See a live stage
show with the
world-famous...

Fan Yang

Event Sponsor:



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