



ARTRICKS

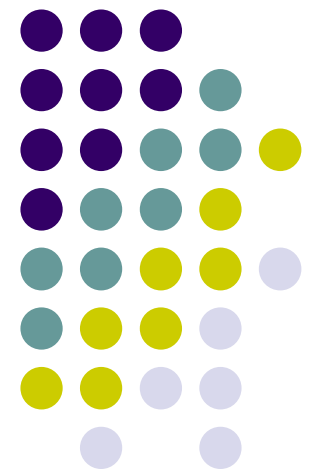
OPTRICKS

EX-I-09

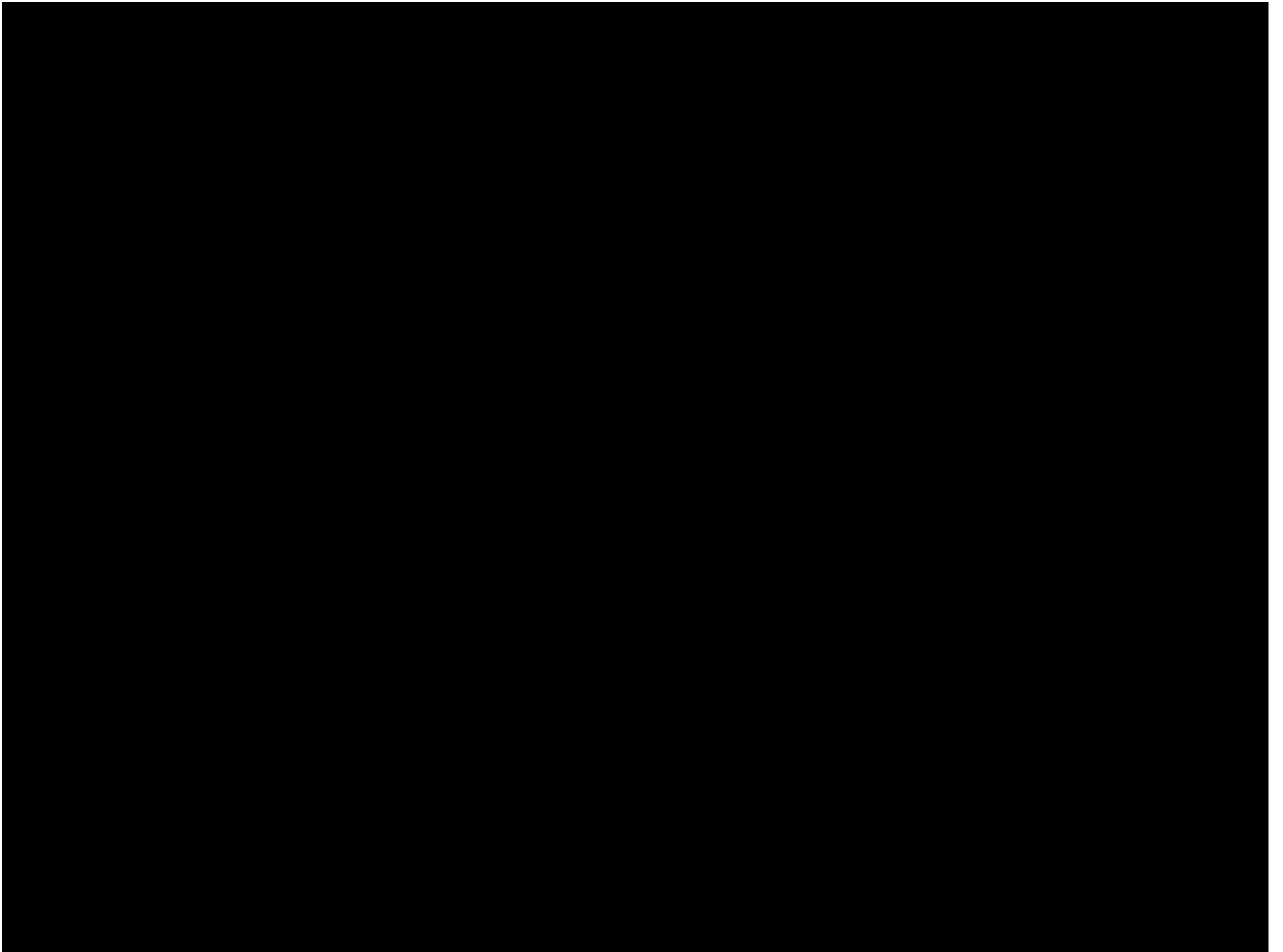
Shih Chieh Huang

Huang, born in Taipei and educated in the United States, is an internationally exhibited new media artist whose recent exhibitions include the 2007 Venice Biennale and the U.S. electronic arts festival "01." Drawing from the well of remix culture, Huang combines stripped electronic parts from the everyday objects that comprise our modern existence and creates a fully inhabited, interactive world that is both obviously familiar and strangely foreign.

Donn M. Silberman
Founding Director
The Optics Institute
Of Southern California



Beall Center
For Art + Technology
University of California, Irvine
Family Day, April 18, 2009
11:00 am to 3 pm



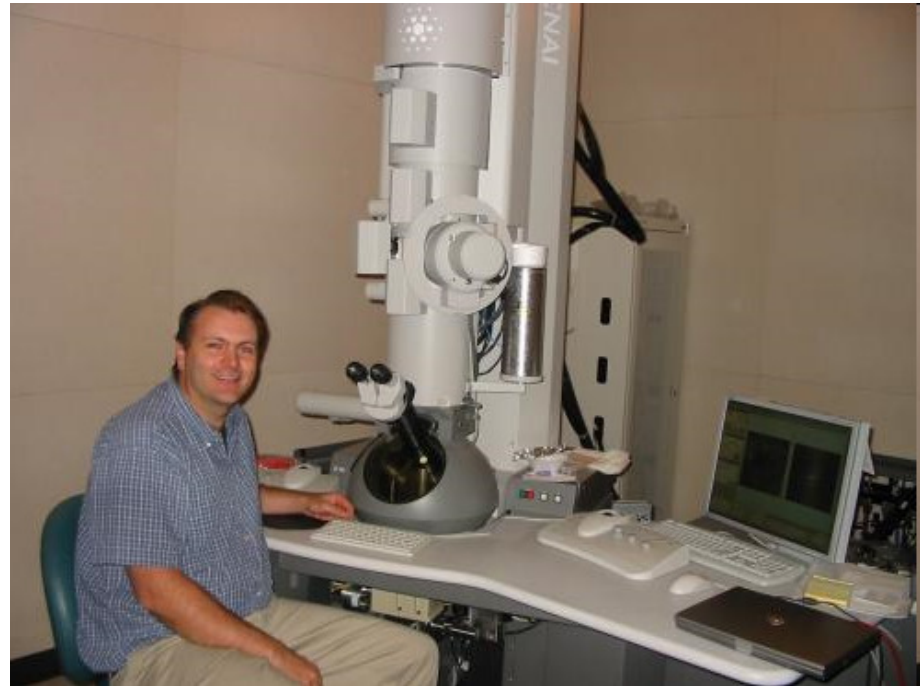
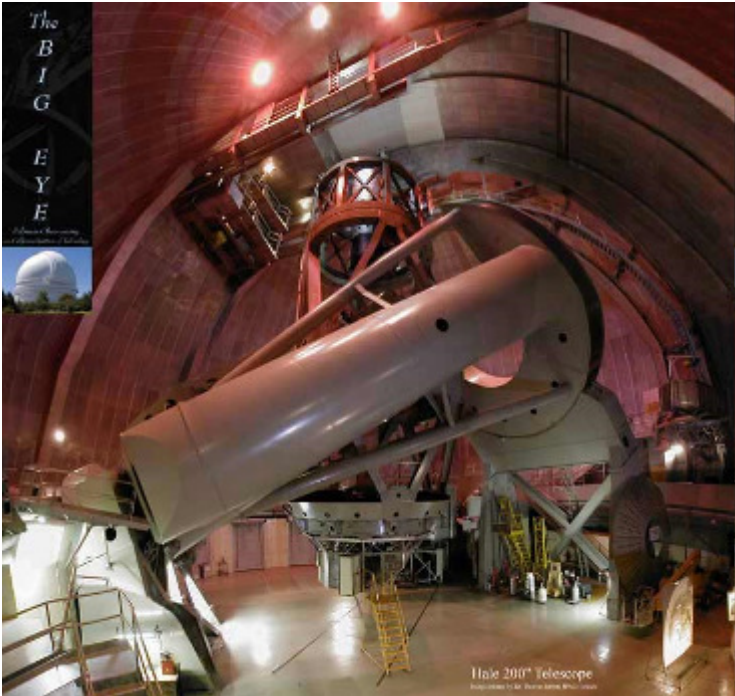
The X-Light

Colors moving in Space-Time





ART

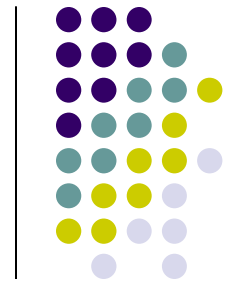
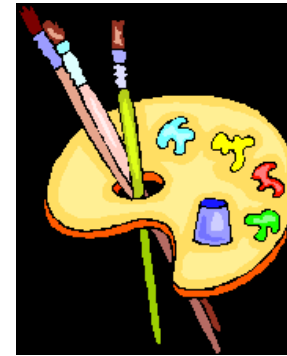


TECHNOLOGY



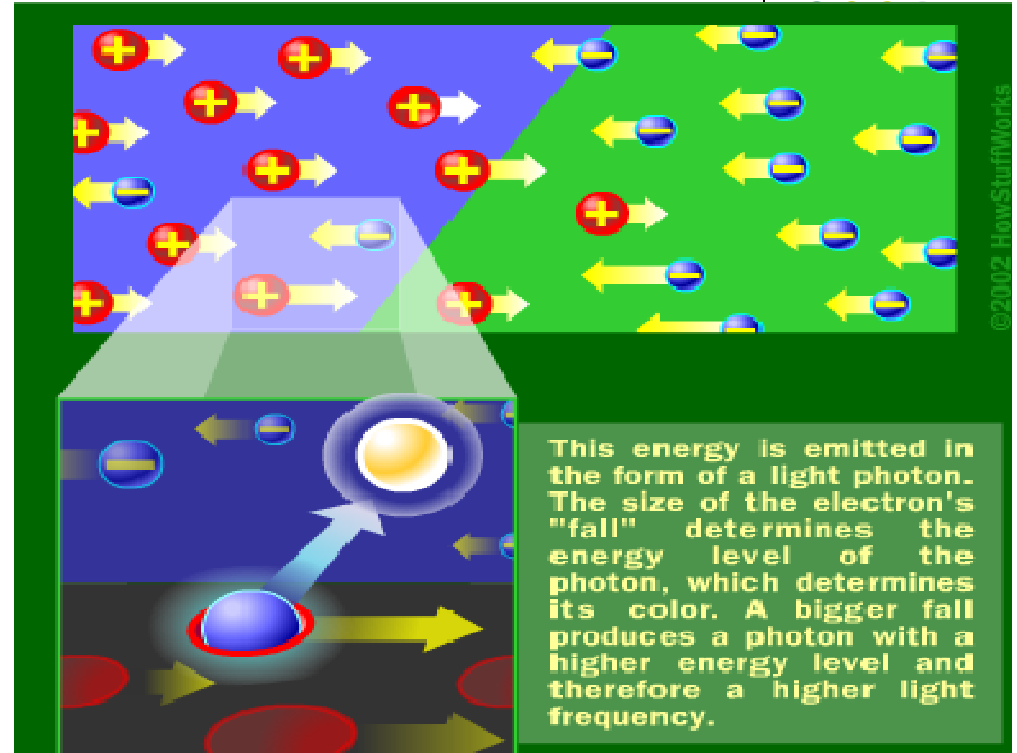
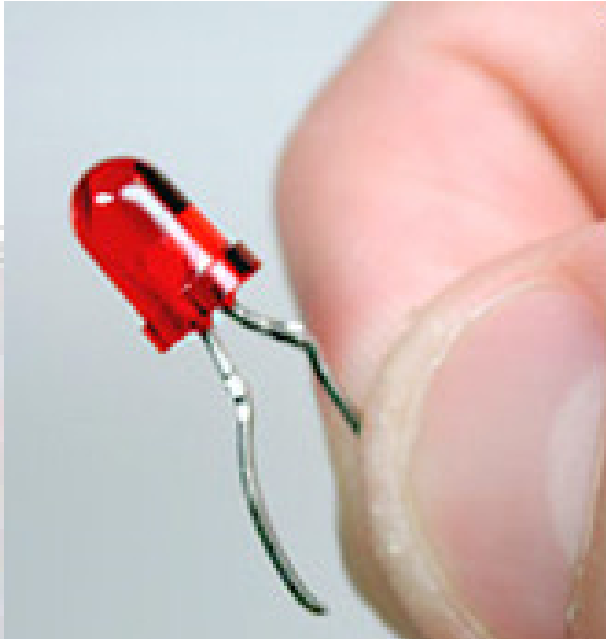
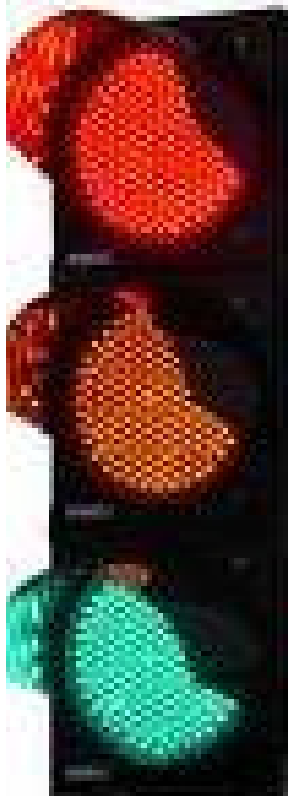
Art + Technology

- Artists have always used 'Technology'
- Some technologies have been around for hundreds of years.
- Some technologies are new
- Some are now called:
“New Media” or “Digital”
- Anyway you look at 'it



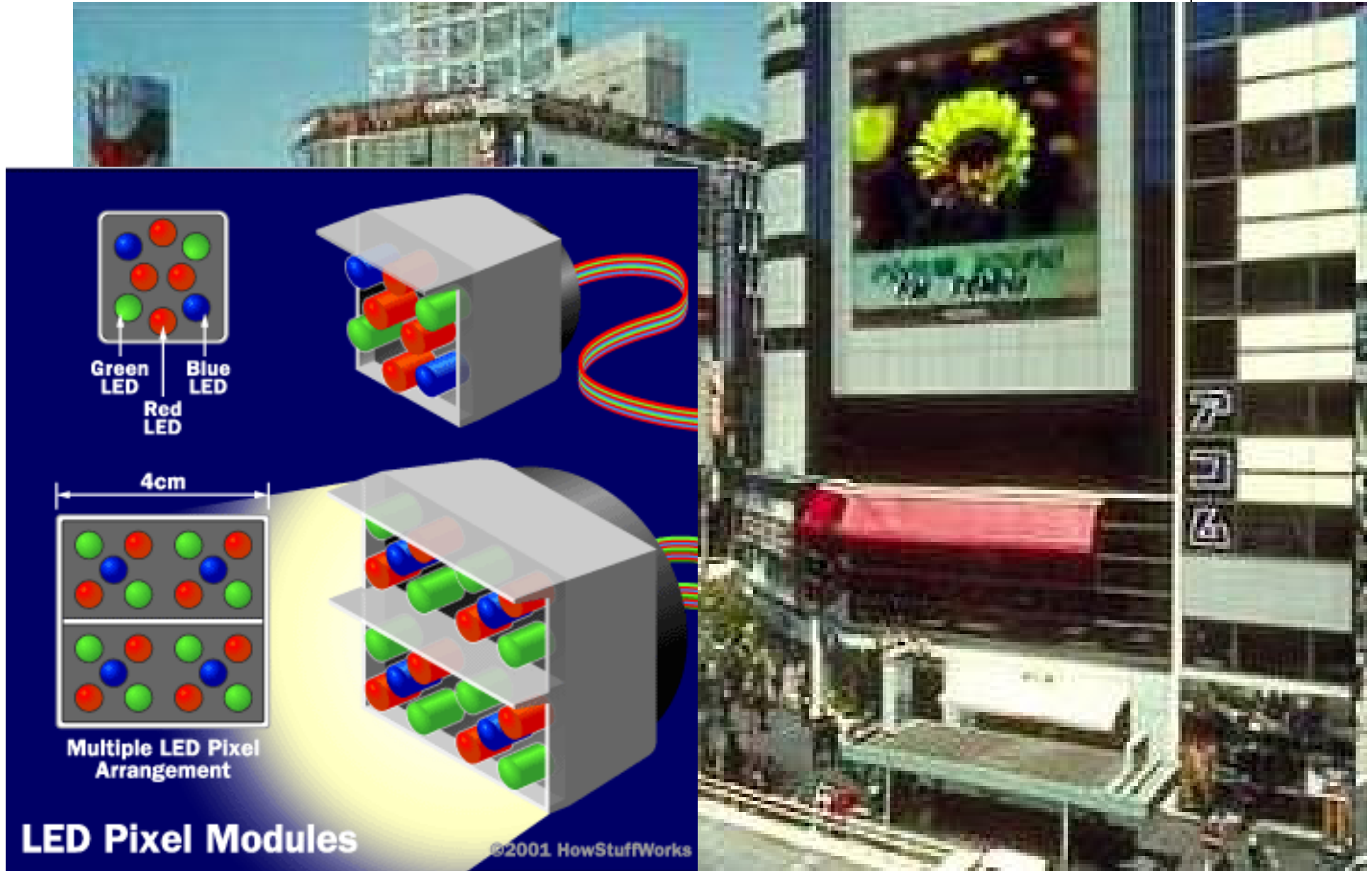
IT IS ALL ART!!

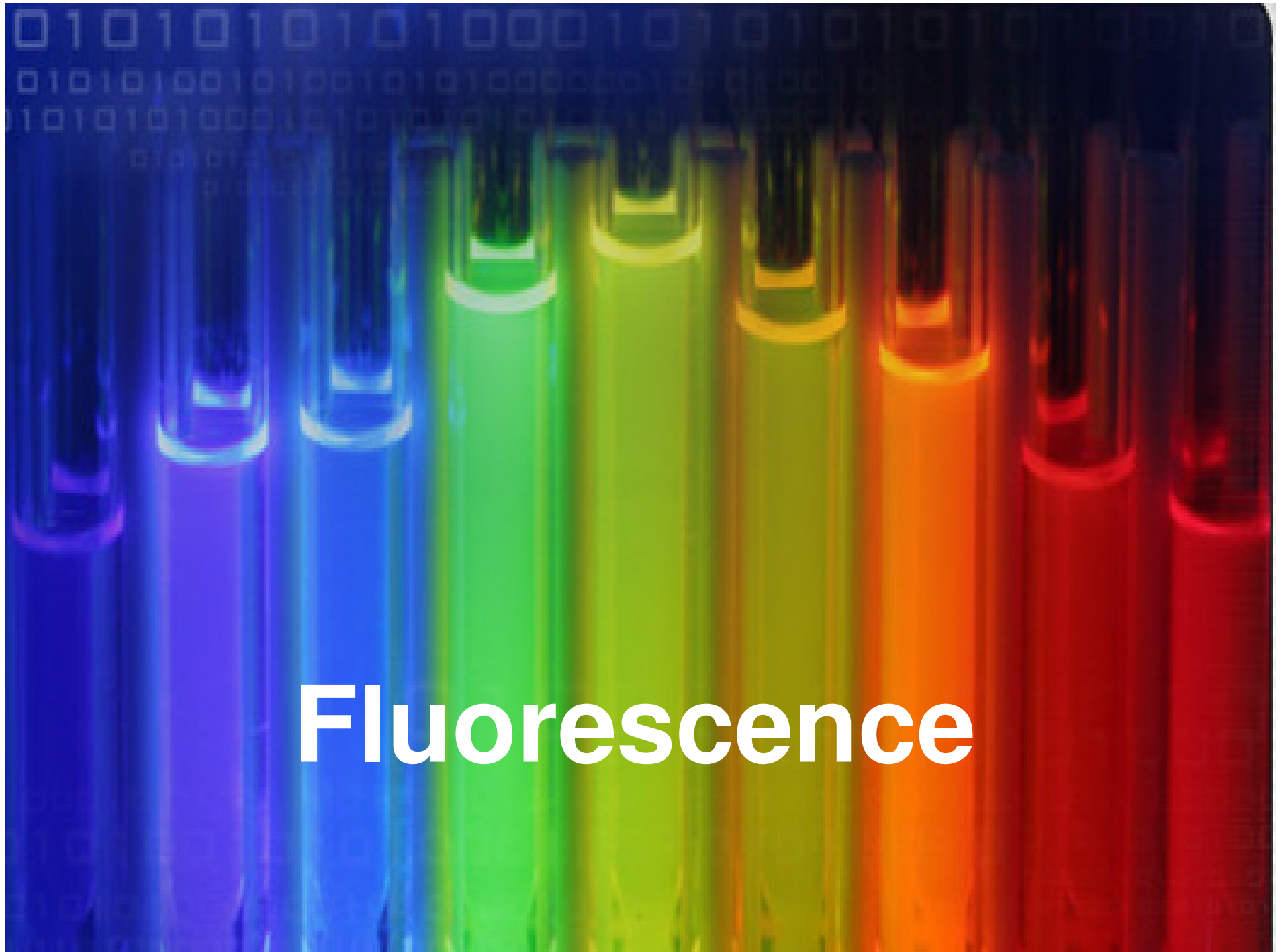
Light Emitting Diodes - LEDs



<http://electronics.howstuffworks.com/led.htm>

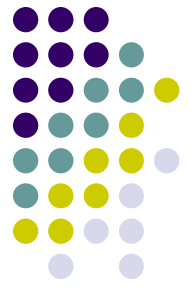
Light Emitting Diodes - LEDs





Fluorescence

Absorption and Emission of Radiation



Absorption

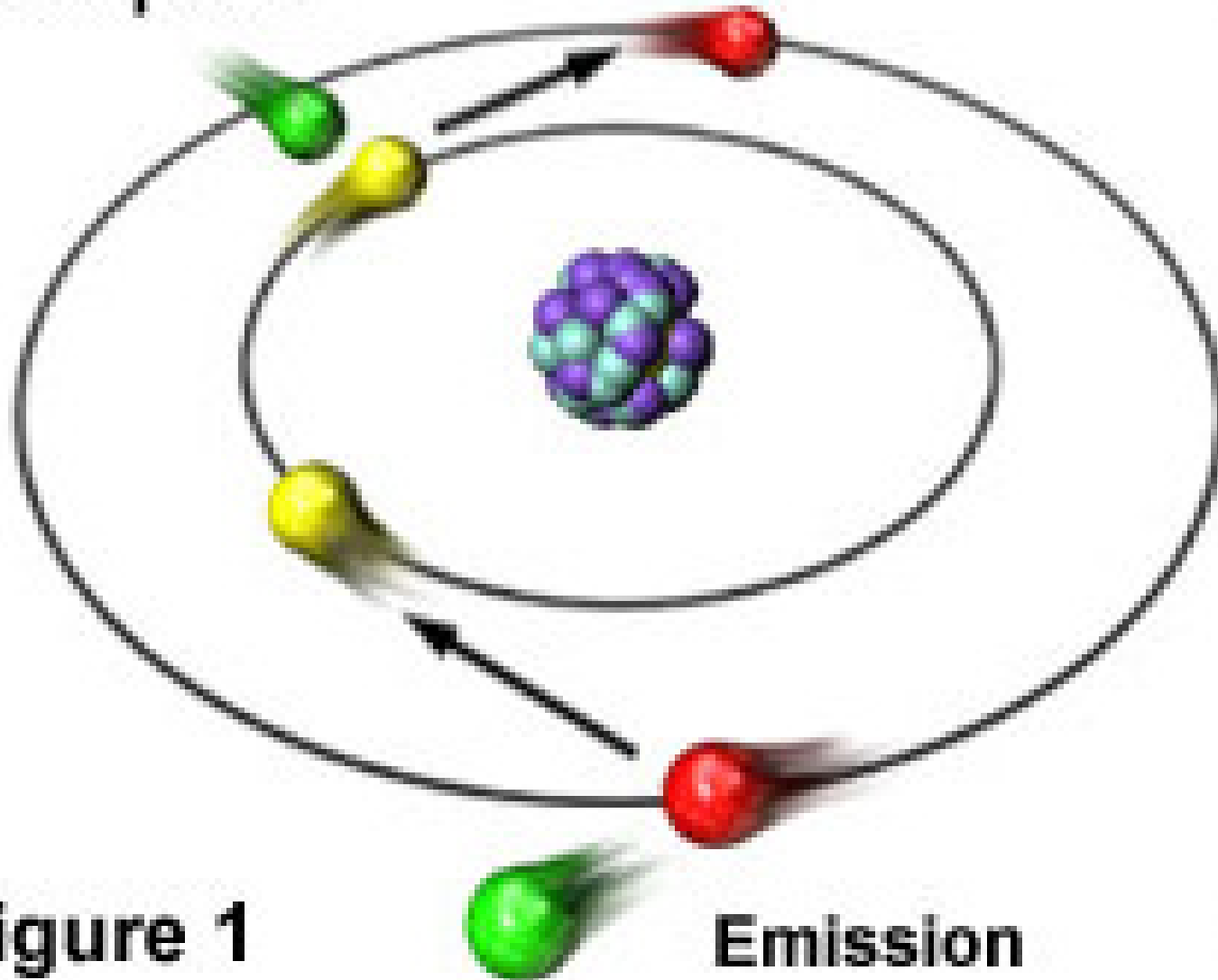
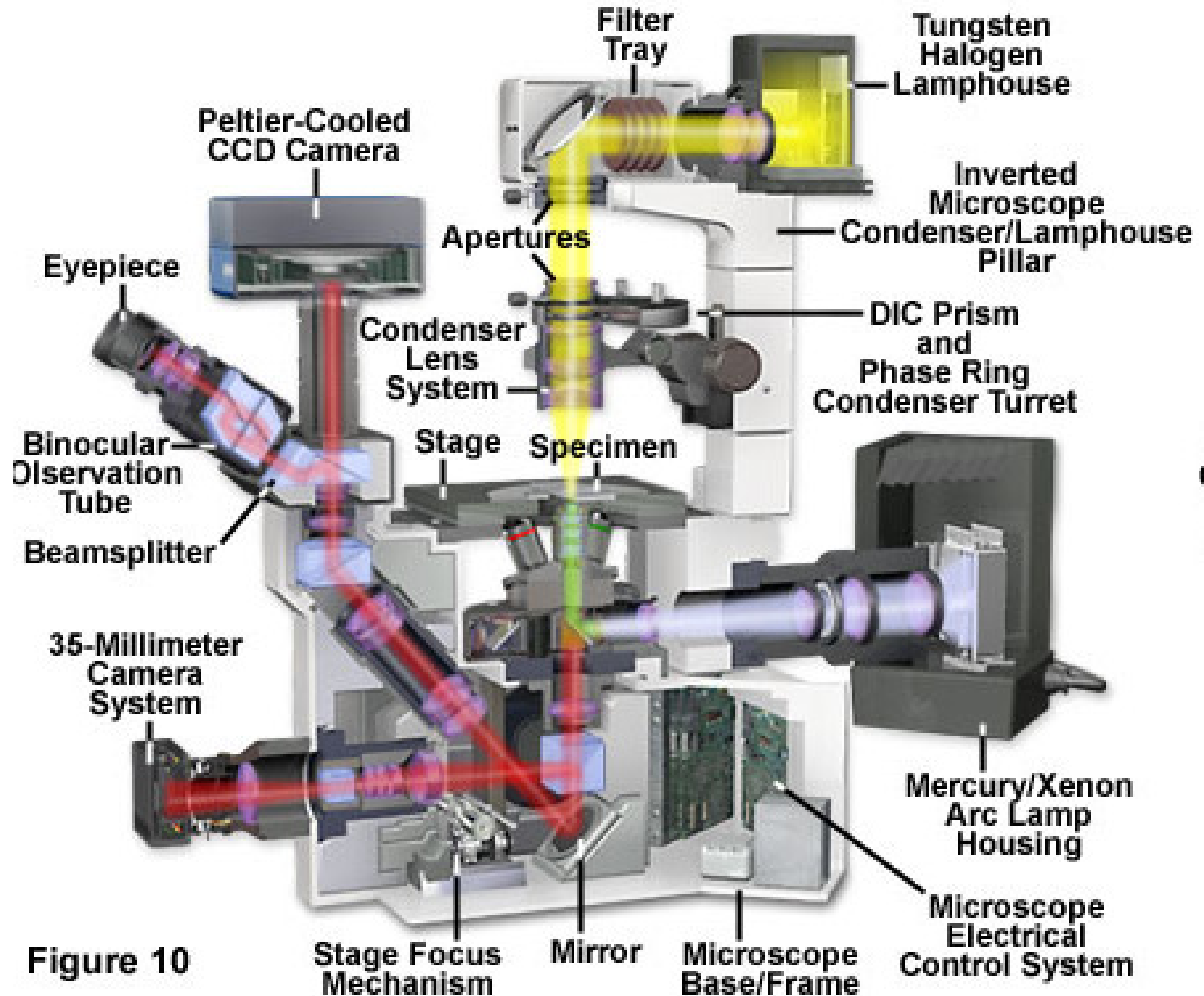


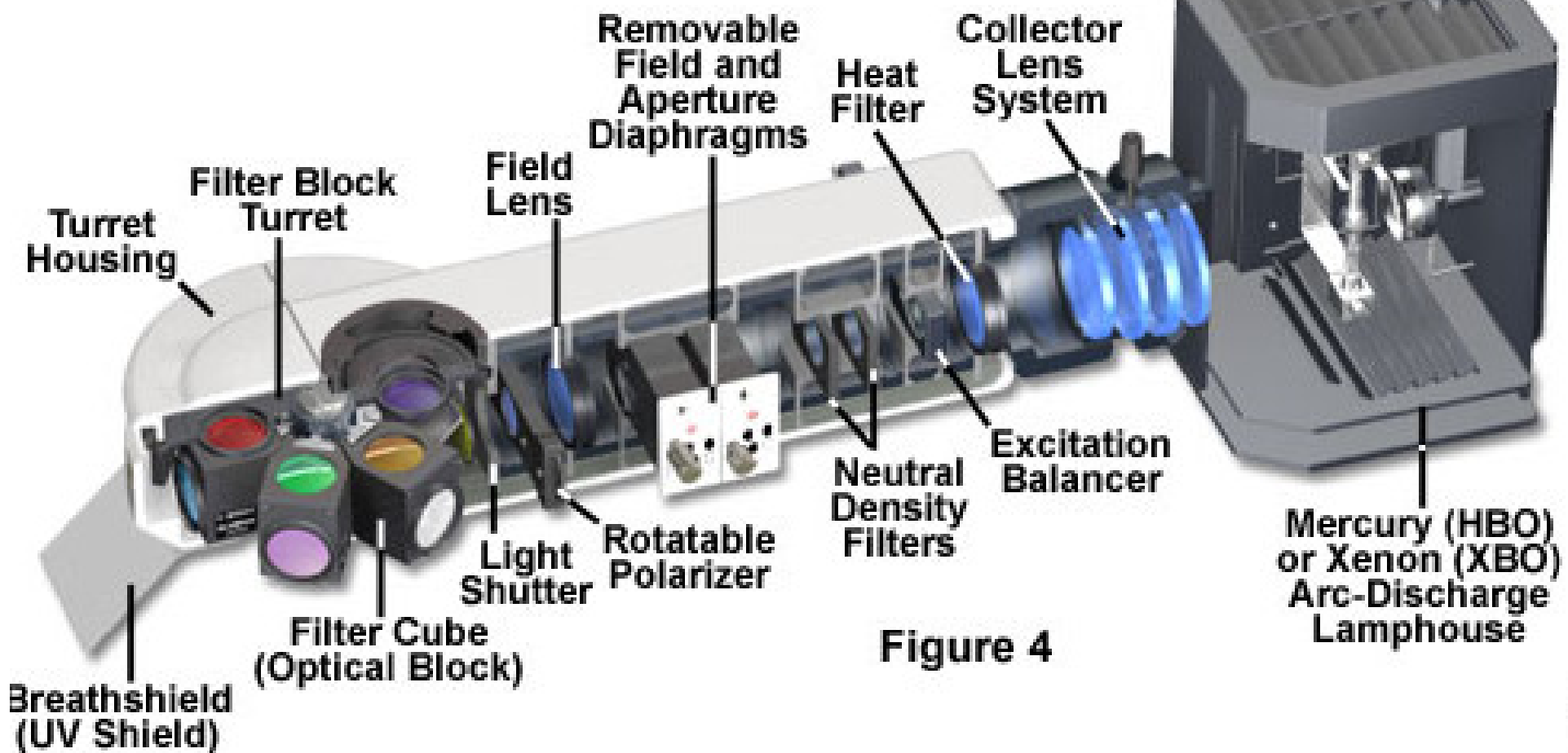
Figure 1

Emission

Inverted Tissue Culture Fluorescence Microscope



Fluorescence Vertical (Episcopic) Illuminator



**UC Irvine has the
Laboratory for Fluorescence Dynamics (LFD)
<http://www.lfd.uci.edu/>**

Köhler Illumination in Reflected Light Fluorescence

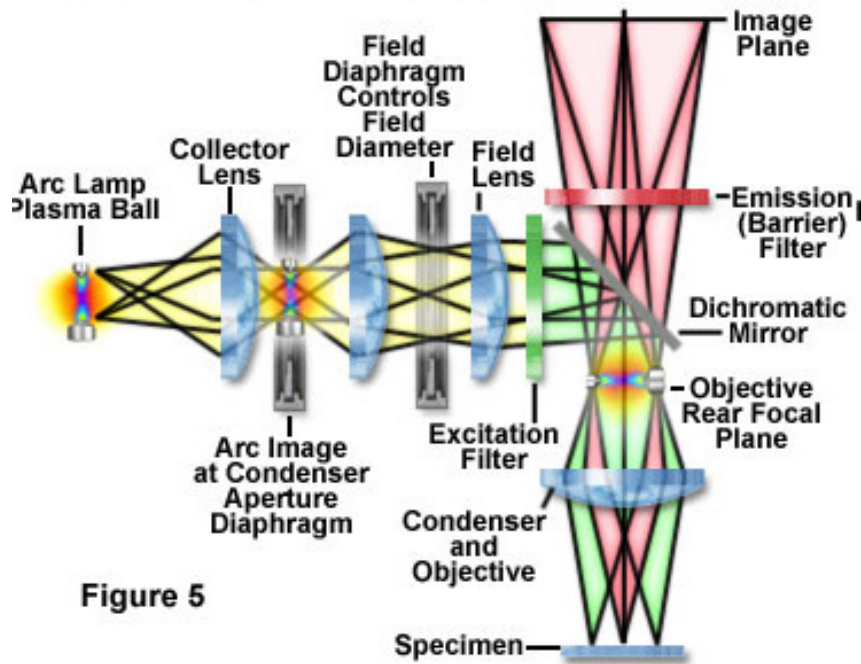


Figure 5

Fluorescence Microscope Arc-Discharge Lamp Housing

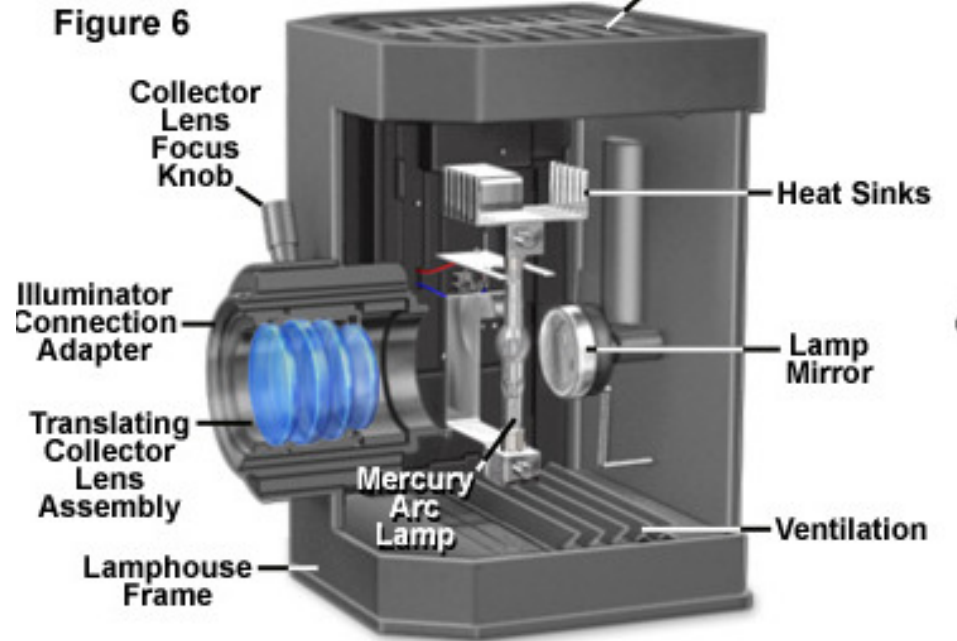


Figure 6

Fluorescence Filter Set Configurations

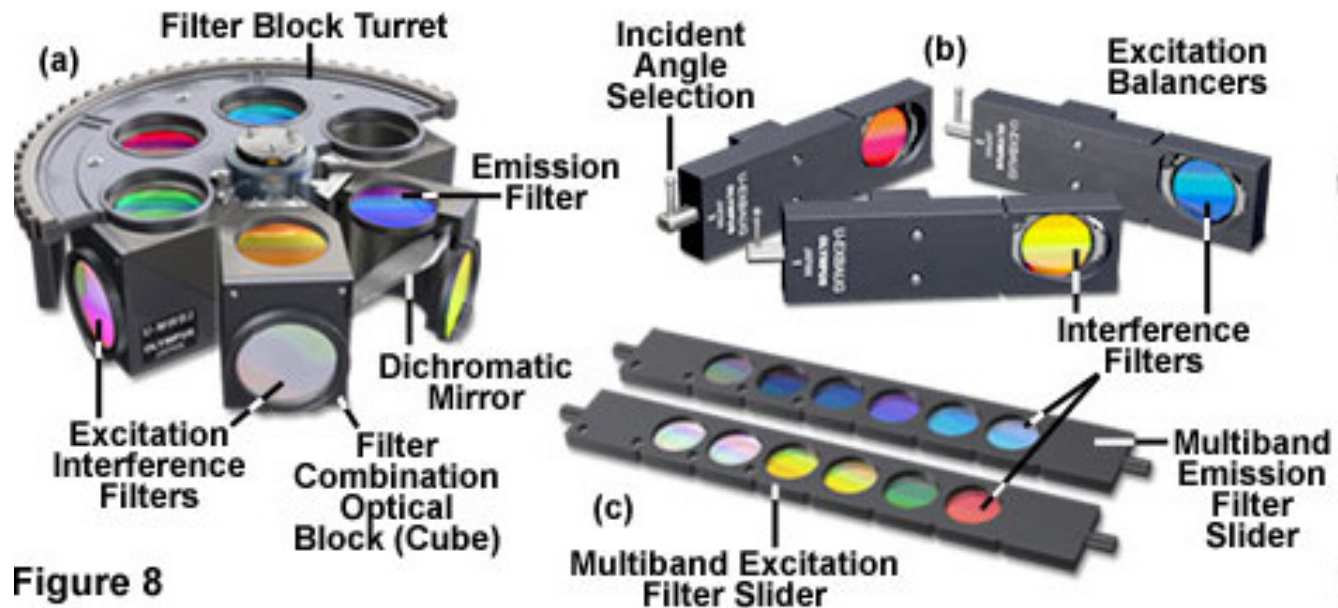
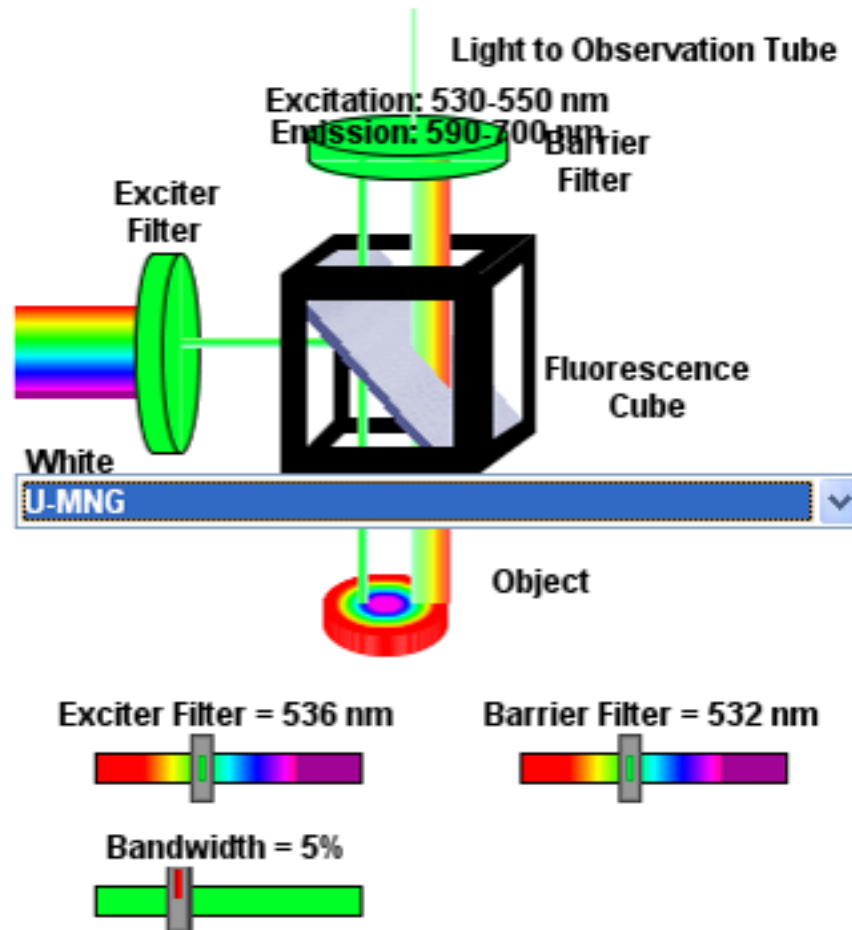


Figure 8



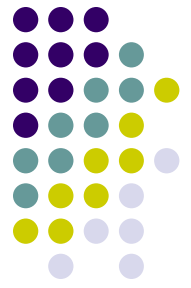
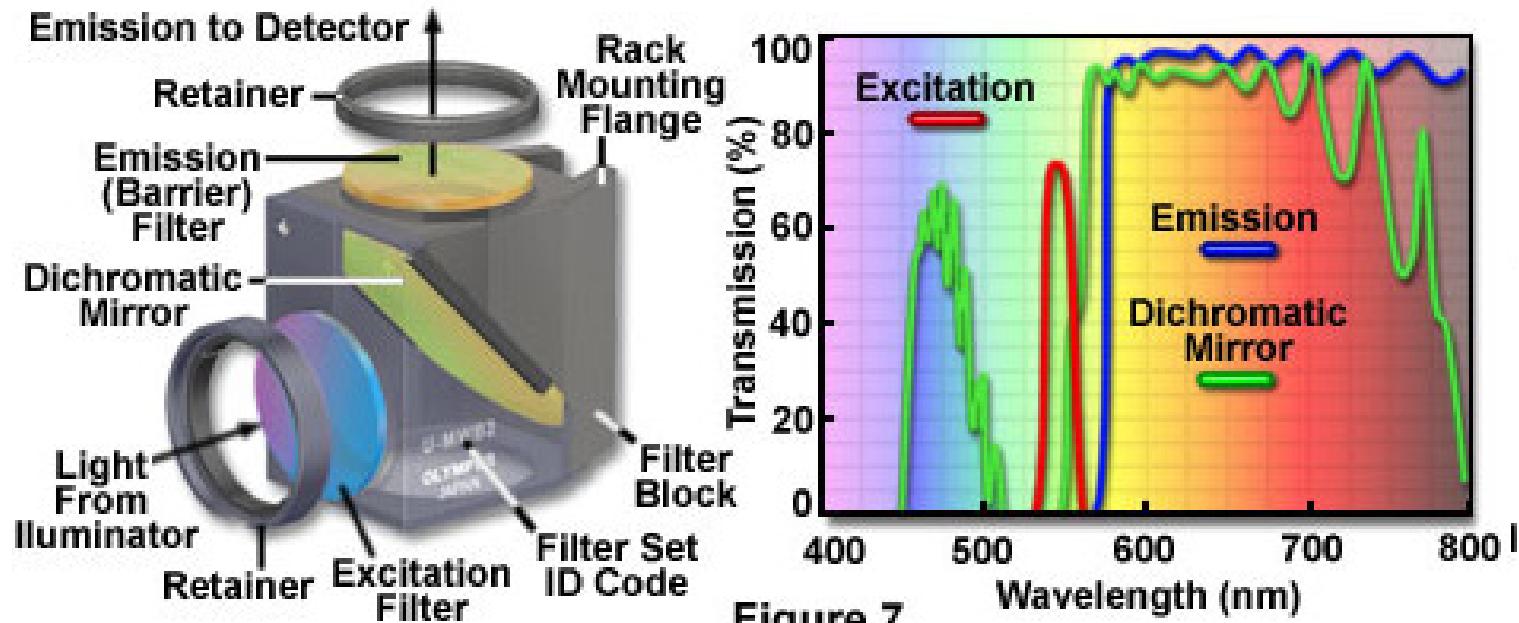
Excitation and Barrier Filters in Fluorescent Microscopy

The fluorescence tutorial explores how excitation and barrier filters can be interchanged to permit a wide spectrum of specific wavelengths to probe fluorescence samples. Detailed instructions on how to operate the tutorial are given below the applet window.

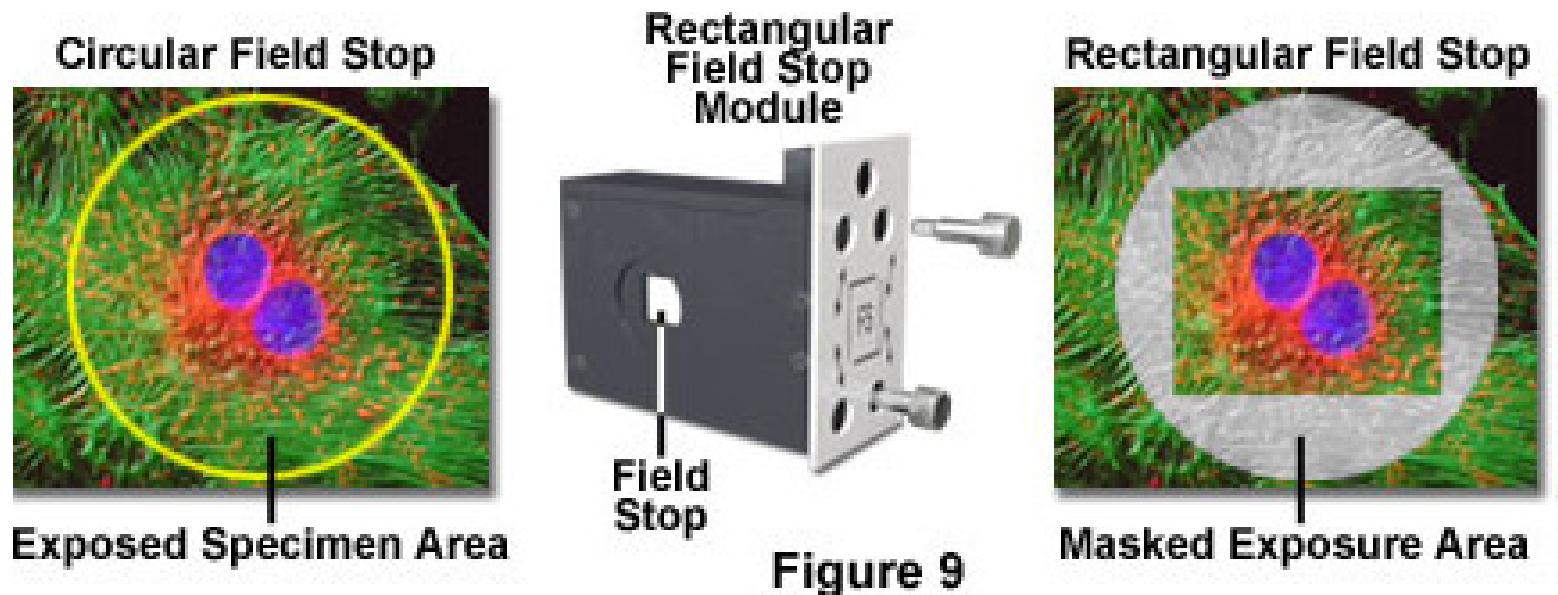


<http://www.olympusmicro.com/primer/>

Fluorescence Filter Cube (Block) and Associated Spectra



Circular and Rectangular Field Stop Comparison



EyeBall Optics

Anatomy of the Human Eye

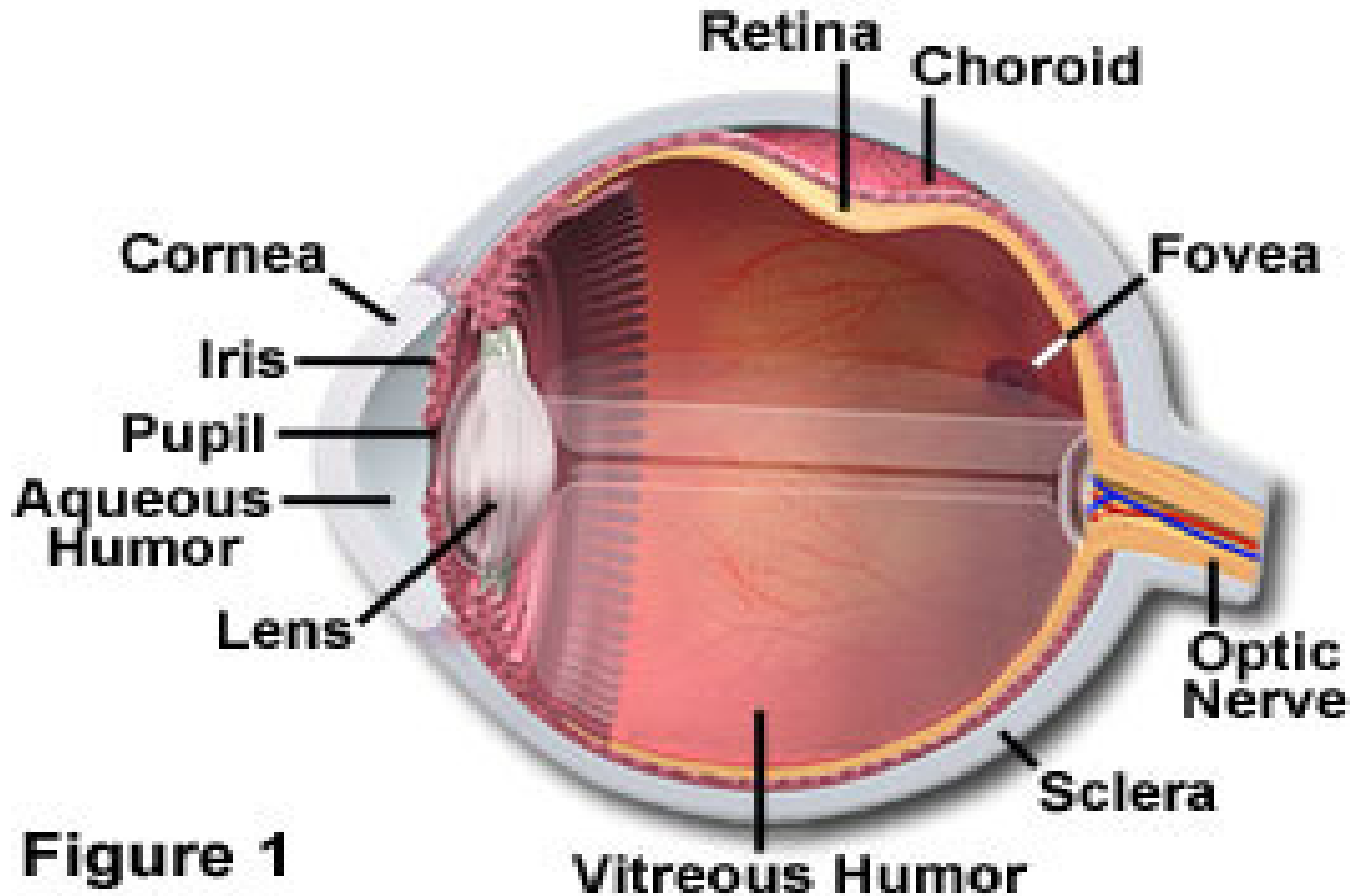
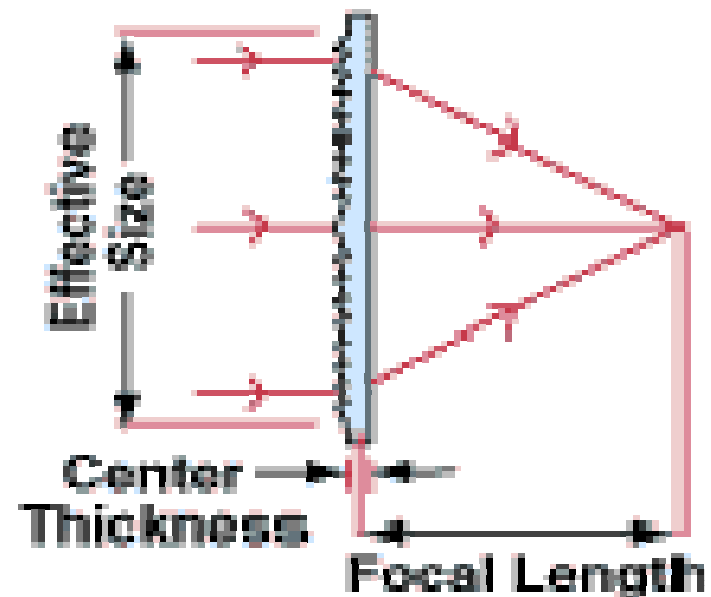
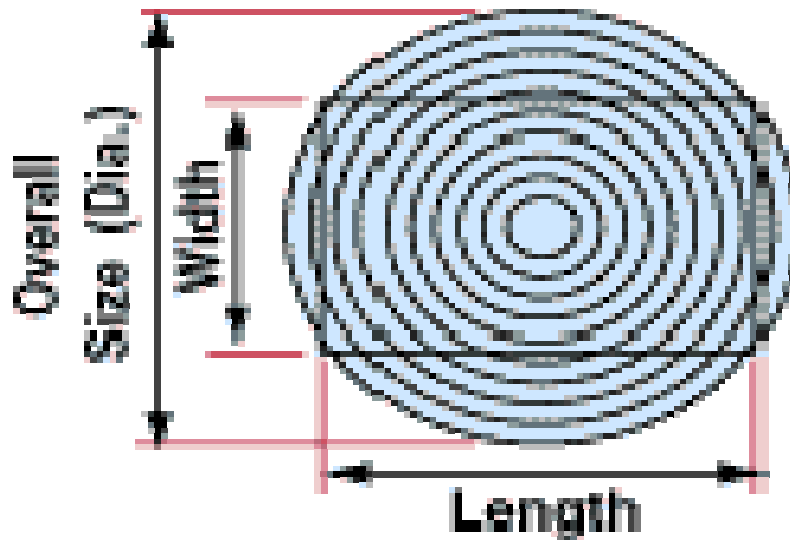


Figure 1

What's a Fresnel Lens Anyway?

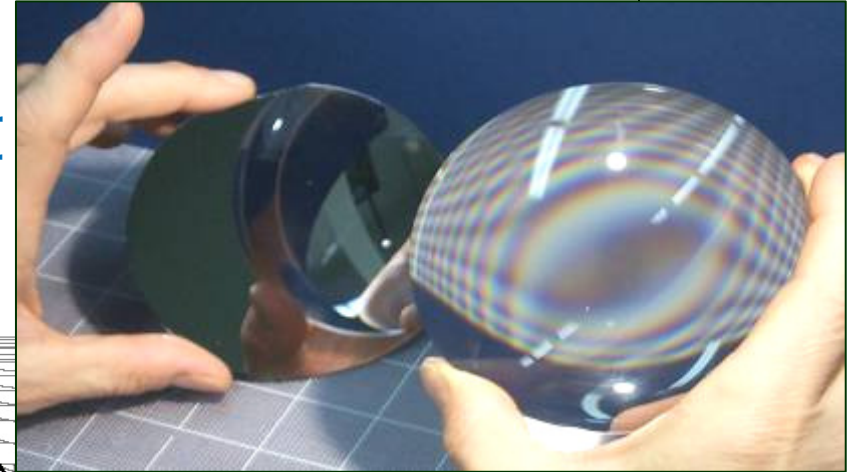


Aberration Examples with overhead projector.

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

GROUP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H 1.0079 HYDROGEN																	
2	Li 6.941 LITHIUM	Be 9.0122 BERYLLIUM																
3	Na 22.990 SODIUM	Mg 24.305 MAGNESIUM																
4	K 39.098 POTASSIUM	Ca 40.078 CALCIUM	Sc 44.956 SCANDIUM	Ti 47.867 TITANIUM	V 50.942 VANADIUM	Cr 51.996 CHROMIUM	Mn 54.938 MANGANESE	Fe 55.845 IRON	Co 58.933 COBALT	Ni 58.693 NICKEL	Cu 63.546 COPPER	Zn 65.39 ZINC	Ga 69.723 GALLIUM	Ge 72.64 GERMANIUM	As 74.922 ARSENIC	Se 78.96 SELENIUM	Br 79.904 BROMINE	Kr 83.80 KRYPTON
5	Rb 85.468 RUBIDIUM	Sr 87.62 STRONTIUM	Y 88.906 YTTORIUM	Zr 91.224 ZIRCONIUM	Nb 92.906 NIOBIUM	Mo 95.94 MOLYBDENUM	Tc 98.906 TECHNETIUM	Ru 101.07 RUTHENIUM	Rh 102.91 RHODIUM	Pd 106.42 PALLADIUM	Ag 107.87 SILVER	Cd 112.41 CADMIUM	In 114.82 INDIUM	Sn 118.71 TIN	Sb 121.76 ANTIMONY	Te 127.60 TELLURIUM	I 126.905 IODINE	Xe 131.29 XEON
6	Cs 132.91 CAESIUM	Ba 137.33 BARIUM	La-Lu 57-71 Lanthanide	Hf 178.49 HAFNIUM	Ta 180.95 TANTALUM	W 183.84 TUNGSTEN	Re 186.21 RHENIUM	Os 190.23 OSMIUM	Ir 192.22 IRIDIUM	Pt 195.08 PLATINUM	Au 196.97 GOLD	Hg 200.59 MERCURY	Tl 204.38 THALLIUM	Pb 207.2 LEAD	Bi 208.98 BISMUTH	Po (209) POLONIUM	At (210) ASTATINE	Rn (222) RADON
7	Fr 87 FRANCIUM	Ra 88 RADIUM	Ac-Lr 89-103 Actinide	Rf 104 RUFORDIUM	Db 105 DUBNIUM	Sg 106 SEABORGIUM	Bh 107 BOHRIUM	Hs 108 HASSIUM	Mt 109 MEITNERIUM	Uun 110 UNUNNIUM	Uub 111 UNUNBIUM	Uuc 112 UNUNTRIUM	Uuq 114 UNUNQUADIUM					

Legend:

- Metals: Blue, Orange, Green
- Semimetals: Red
- Nonmetals: Yellow, Light Green
- Alkali metal: Light Blue
- Alkaline earth metal: Light Orange
- Transition metals: Light Green
- Lanthanide: Light Purple
- Actinide: Light Red
- Chalcogens element: Light Yellow
- Halogens element: Light Green
- Noble gas: Light Blue

Standard State (25°C, 101 kPa):

- Ne - gas, Fe - solid, Ga - liquid, Tc - synthetic

LANTHANIDE

57 138.91 La	58 140.12 Ce	59 140.91 Pr	60 144.24 Nd	61 (145) Pm	62 150.36 Sm	63 151.96 Eu	64 157.25 Gd	65 158.93 Tb	66 162.50 Dy	67 164.93 Ho	68 167.26 Er	69 168.93 Tm	70 173.04 Yb	71 174.97 Lu
LANTHANUM	CERIUM	PRASEODYMIUM	NEODYMIUM	PROMETHIUM	SAMARIUM	EUROPIUM	GADOLINIUM	TERBIUM	DYSPROSIUM	HOLMIUM	ERBIUM	THULIUM	YTERBIUM	LUTETIUM

ACTINIDE

89 (227) Ac	90 232.04 Th	91 231.04 Pa	92 238.03 U	93 (237) Np	94 (244) Pu	95 (243) Am	96 (247) Cm	97 (247) Bk	98 (251) Cf	99 (252) Es	100 (257) Fm	101 (258) Md	102 (259) No	103 (262) Lr
ACTINIUM	THORIUM	PROTACTINIUM	URANIUM	NEPTUNIUM	PLUTONIUM	AMERICIUM	CURSIUM	BERKELIUM	CALIFORNIUM	EINSTEINIUM	FERMIDIUM	Mendelevium	NOBELIUM	LAURENCIUM

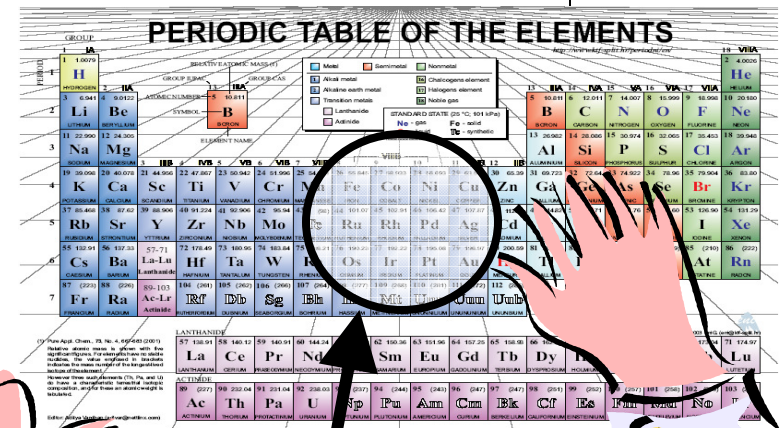
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Magic Dots

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??

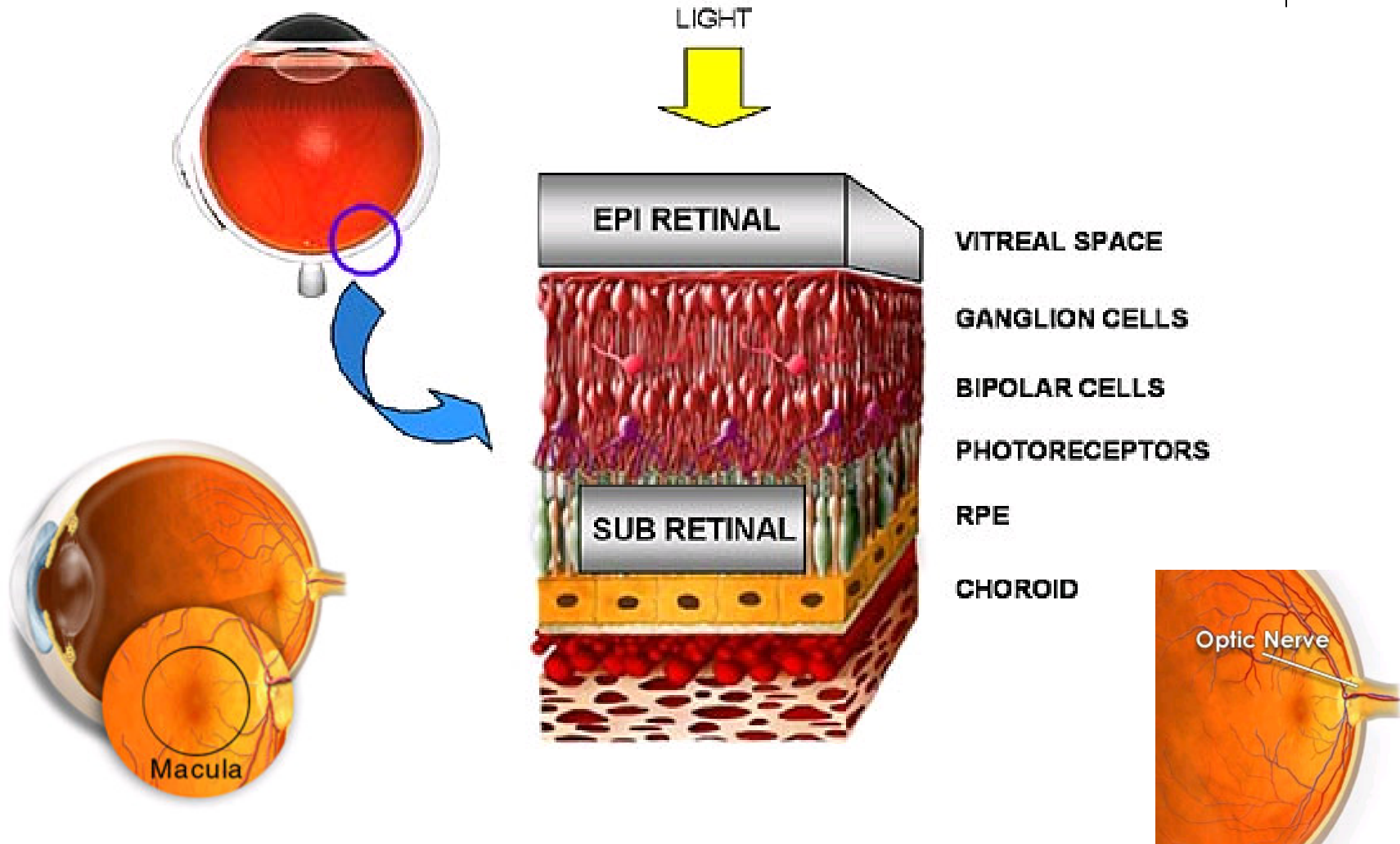


Small Magnifying Lens

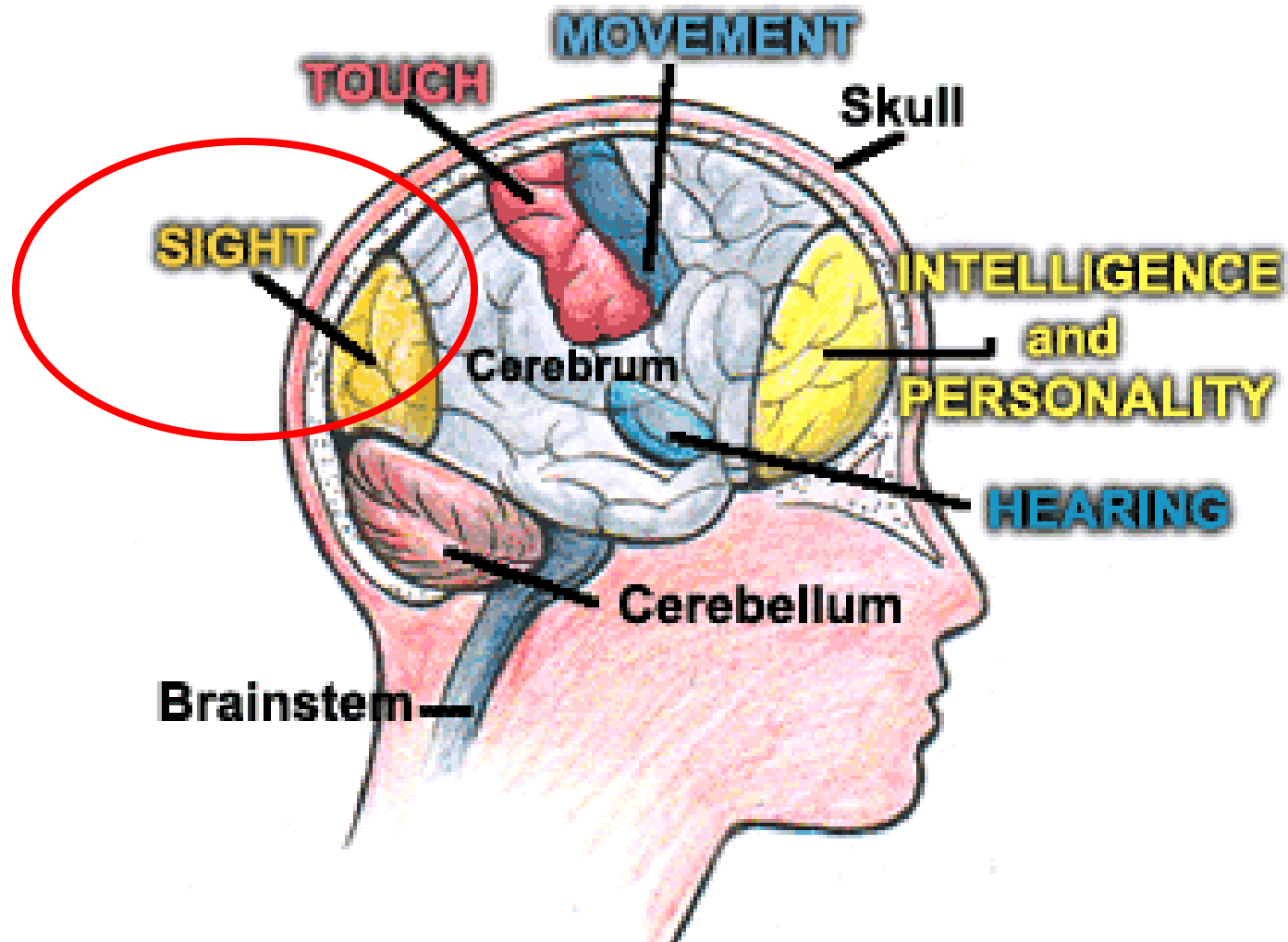
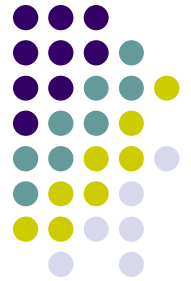
Hold the lens about 1 inch above the paper.

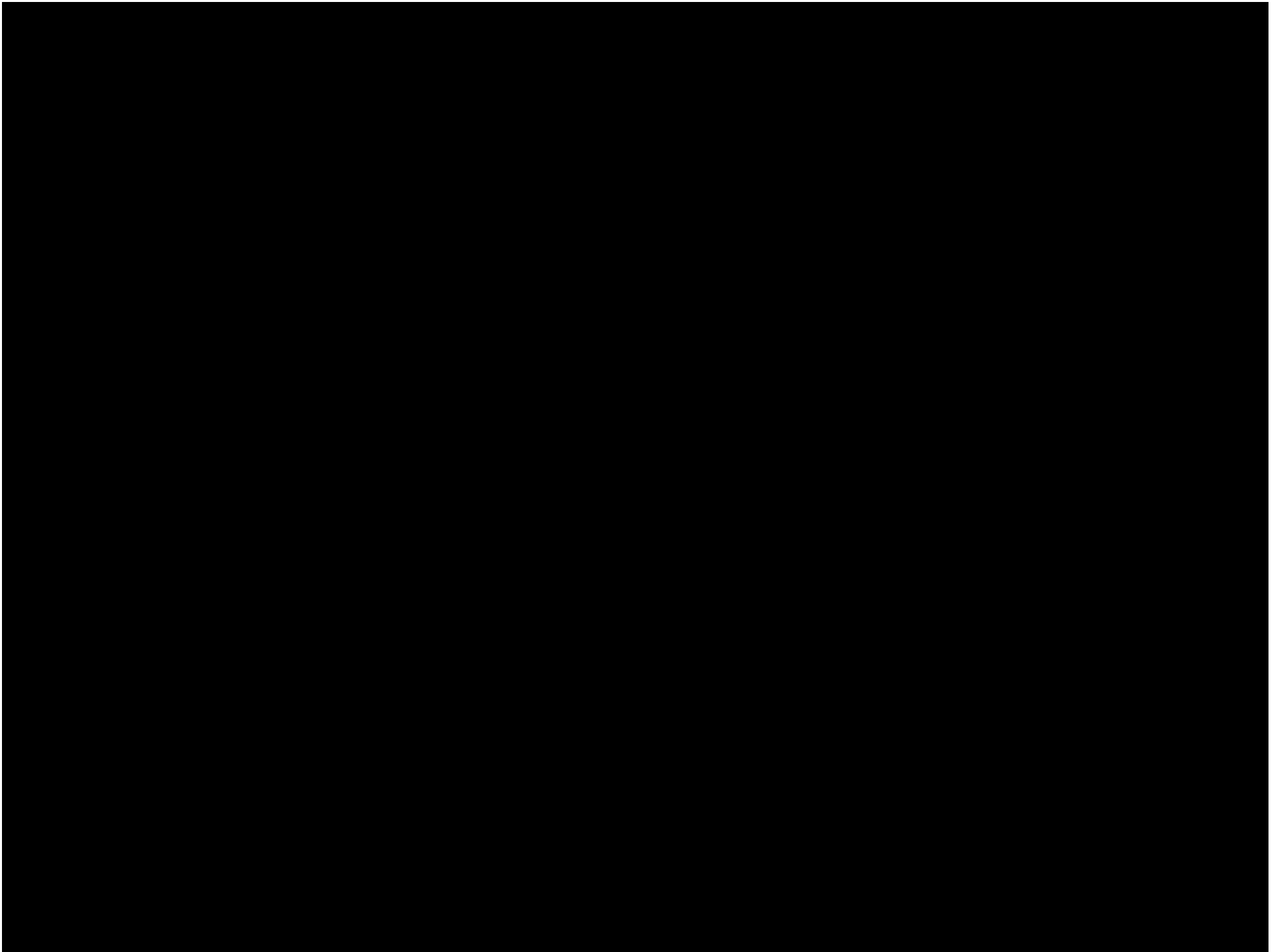


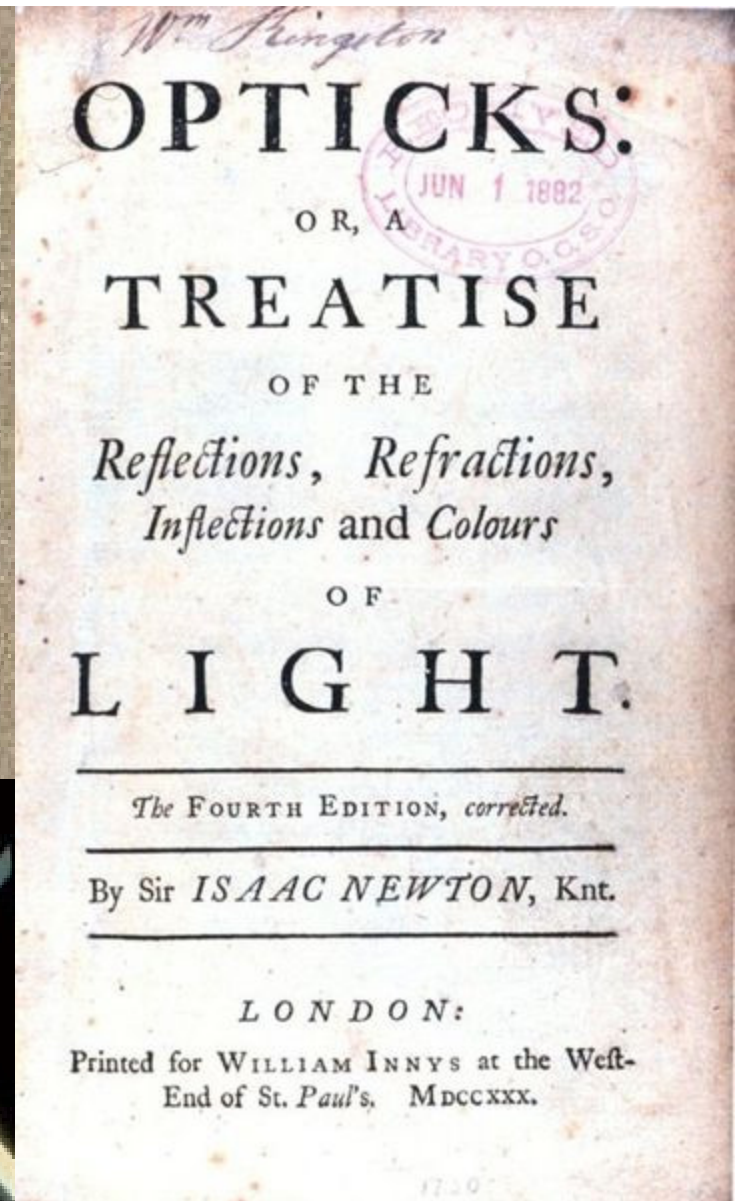
The Retina as a Detector

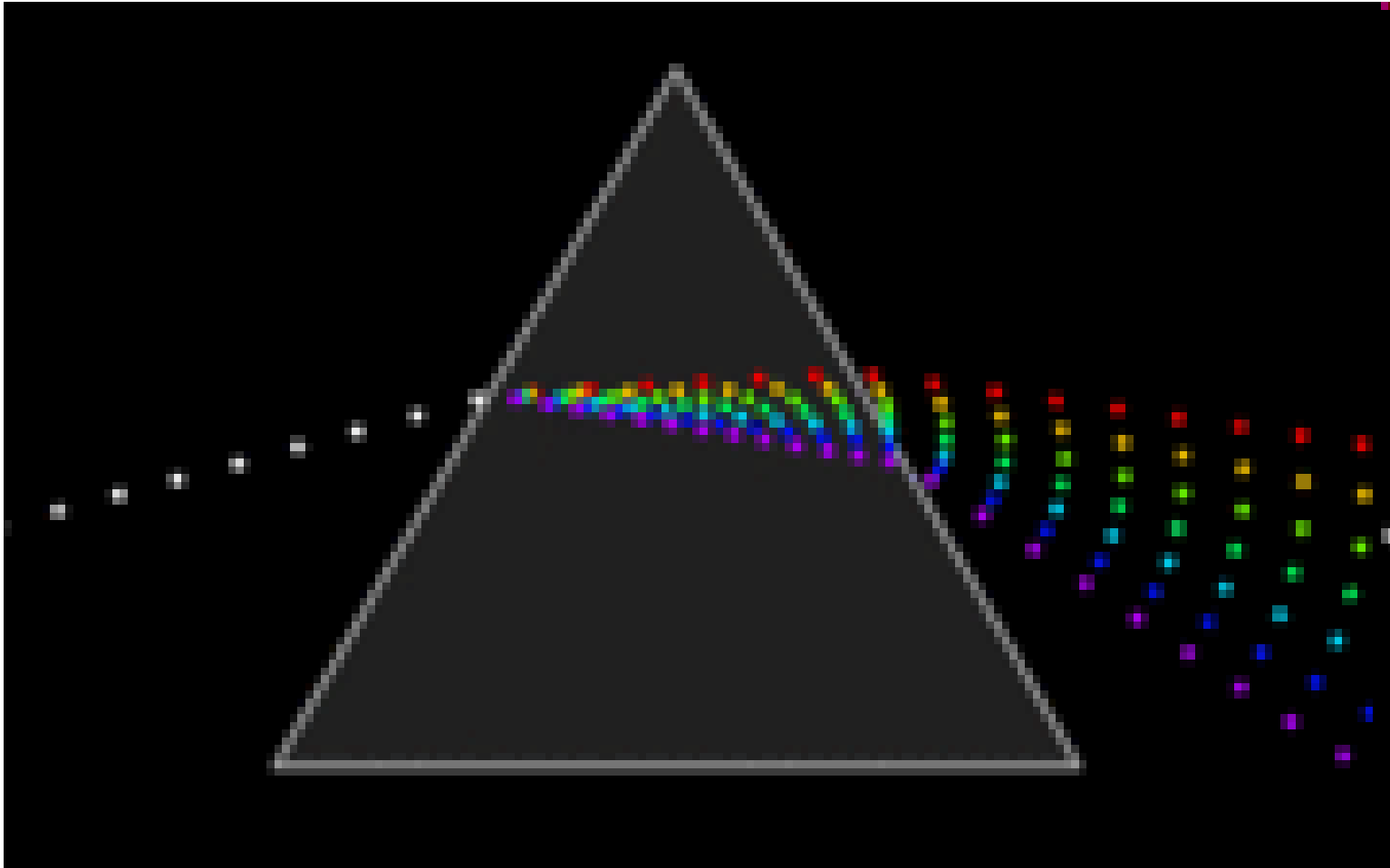


The Brain as a Computer









http://en.wikipedia.org/wiki/Image:Light_dispersion_conceptual.gif

Rainbow Peephole®

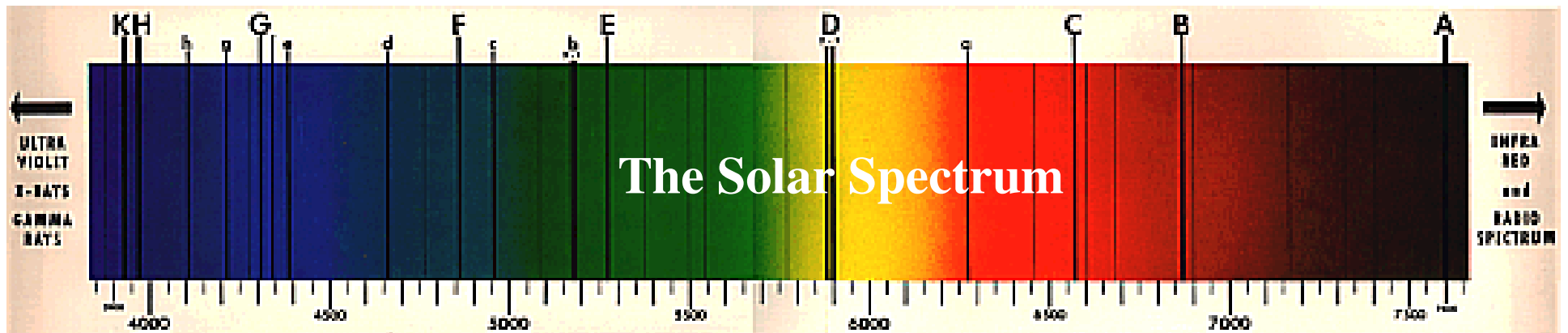
Diffraction Gratings



- Light 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 light is close or far from the peephole? How?
- 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

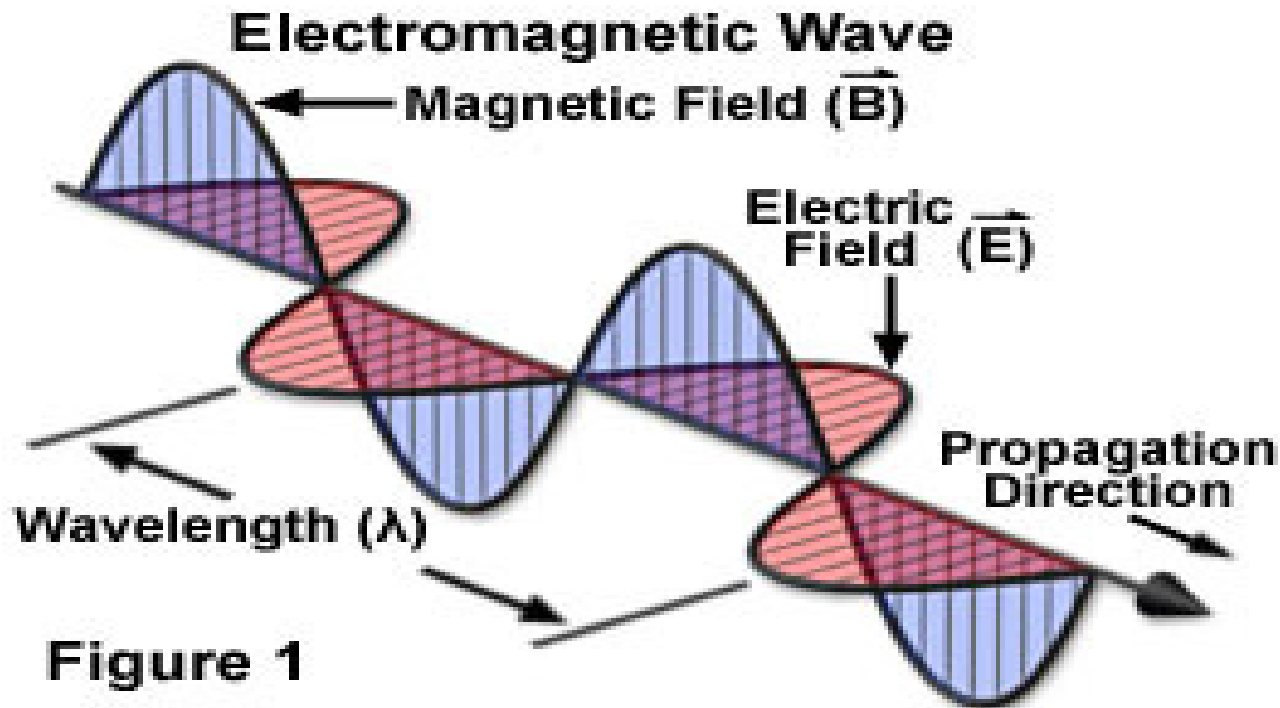
Visible

IR
Radio



What is Light??

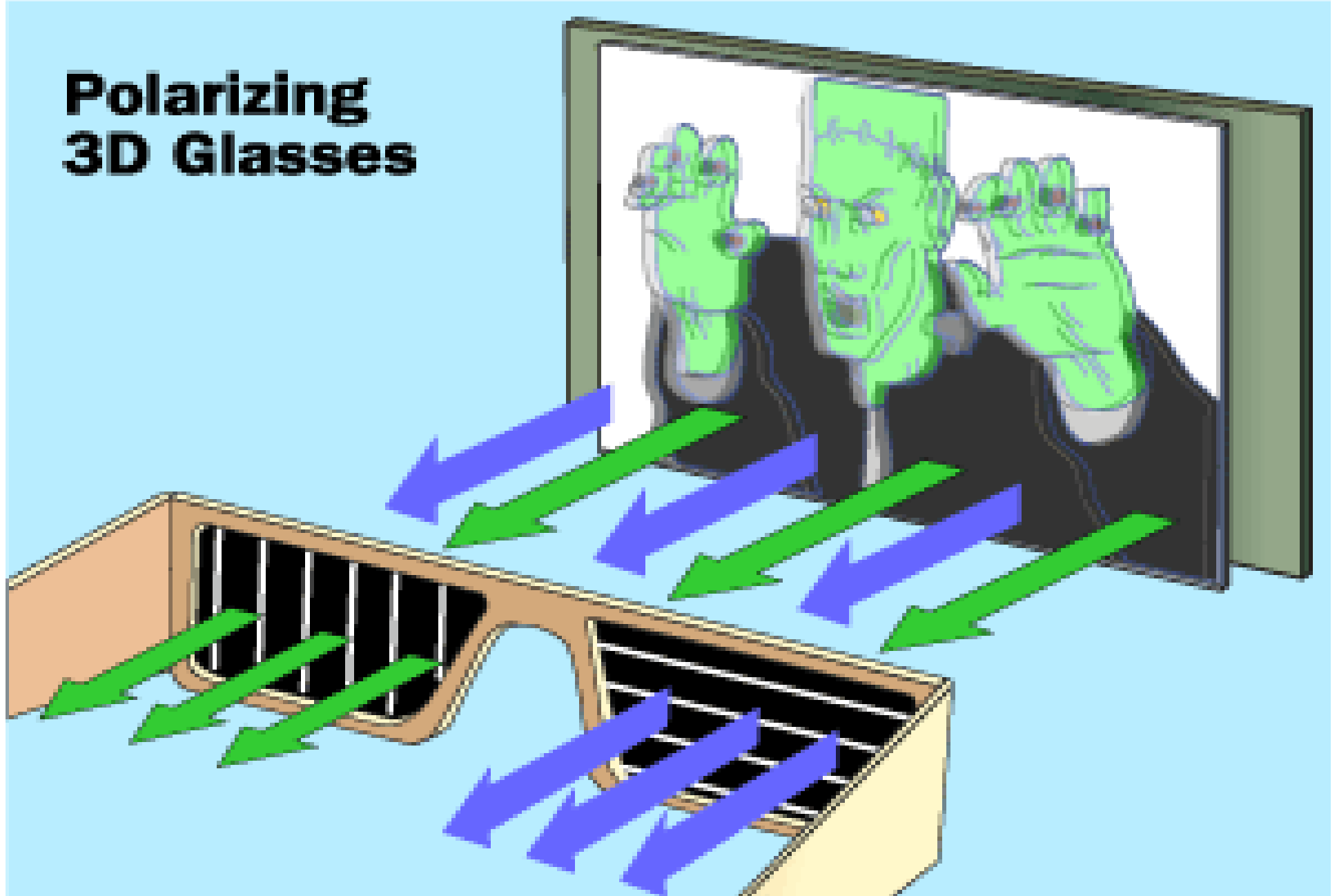
Light is Like a Vibrating Wave



Slinky

- Figure 1
- Light is like pure energy with no rest mass (because it is never at rest!!)

Polarizing 3D Glasses

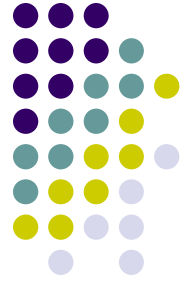


The polarized glasses allow only one of the images into each eye because each lens has a different polarization. Image courtesy of howstuffworks.com

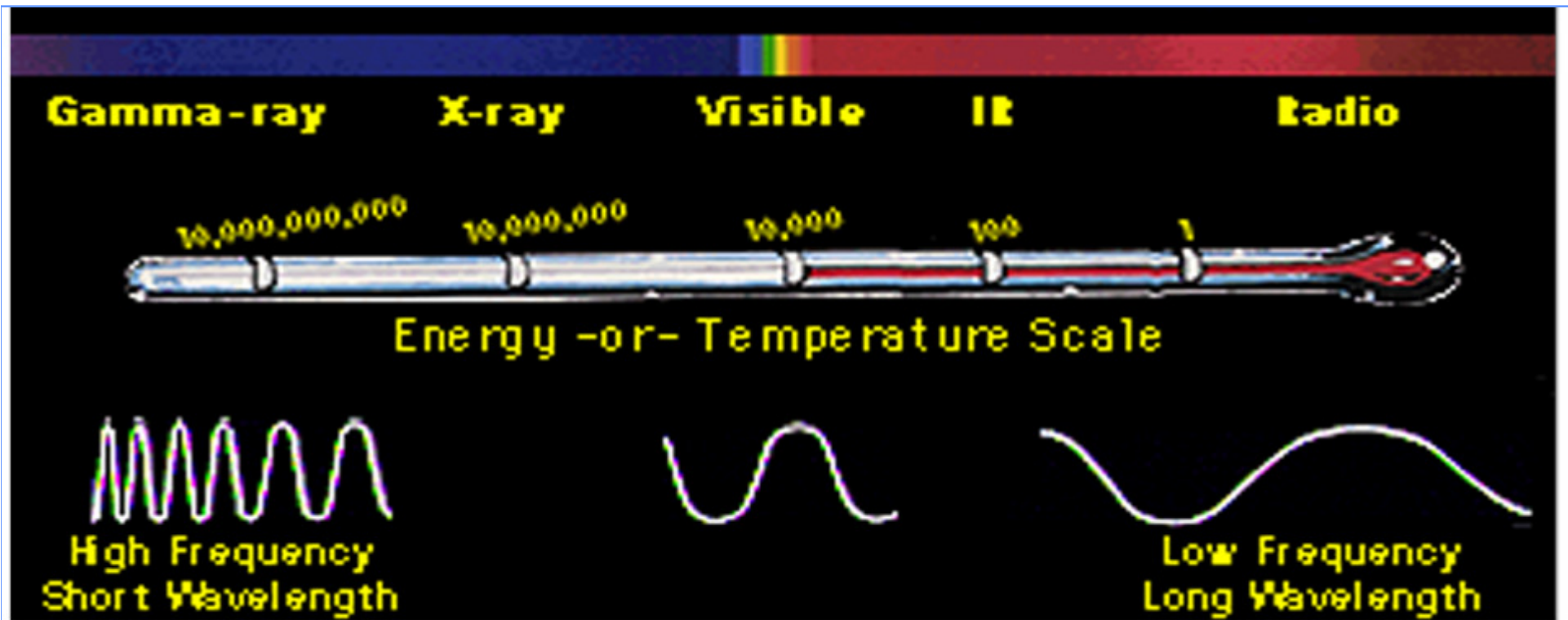
Magic Stripes

Polarization of Light

- **Where do the colors come from?**
- **Make your own polariscope and find the stripes in the plastic and glass materials.**
- **Geologists, identify minerals with polarized light microscopes.**
- **Civil engineers examine stresses inside structures with transparent models and a polariscope.**



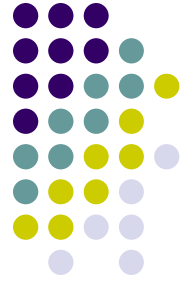
LIGHT - Electromagnetic Spectrum



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)



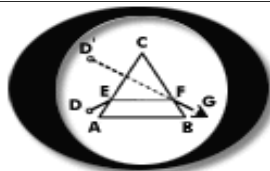
- Place the patch on your wrist and perform the “vampire test.”
- The “*Magic Patch*” changes color with the heat from your body. The “living dead” give off no heat!
- Where do the colors come from?
- Does anyone see a vein or artery?
- This is an example of “selective reflection” by liquid crystals, 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.



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- We would like to thank our sponsors and partners on the following slide.
- Enjoy the rest of your Family Day Event



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OF SOUTHERN CALIFORNIA



The International Society
for Optical Engineering



**The Optics Institute
Of Southern California**



ATEP

Advanced Technology & Education Park

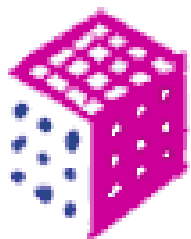


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