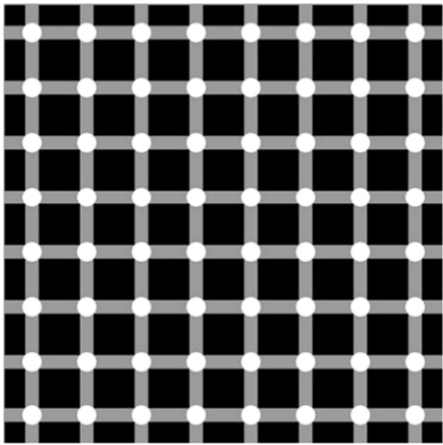


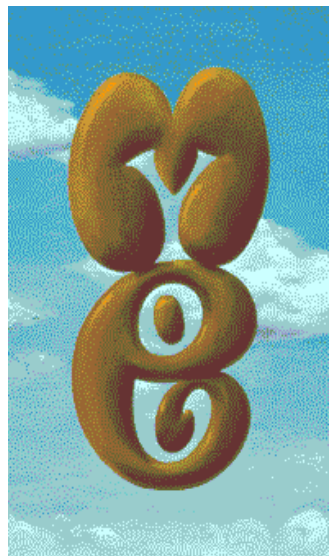
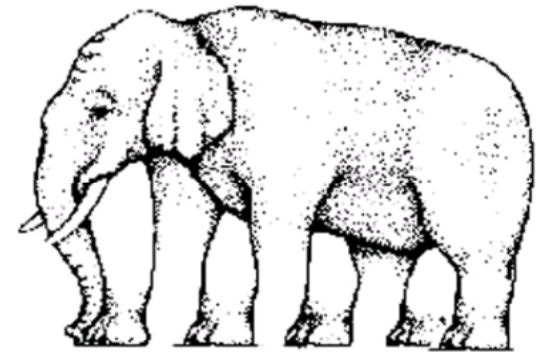
GE1338

Seeing is believing,  
or is it?

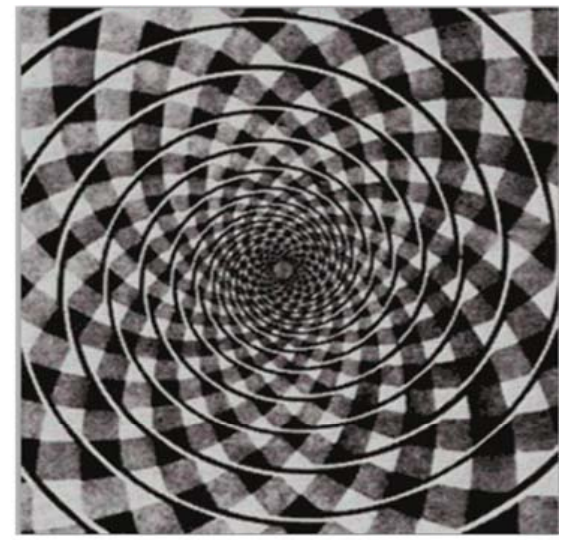
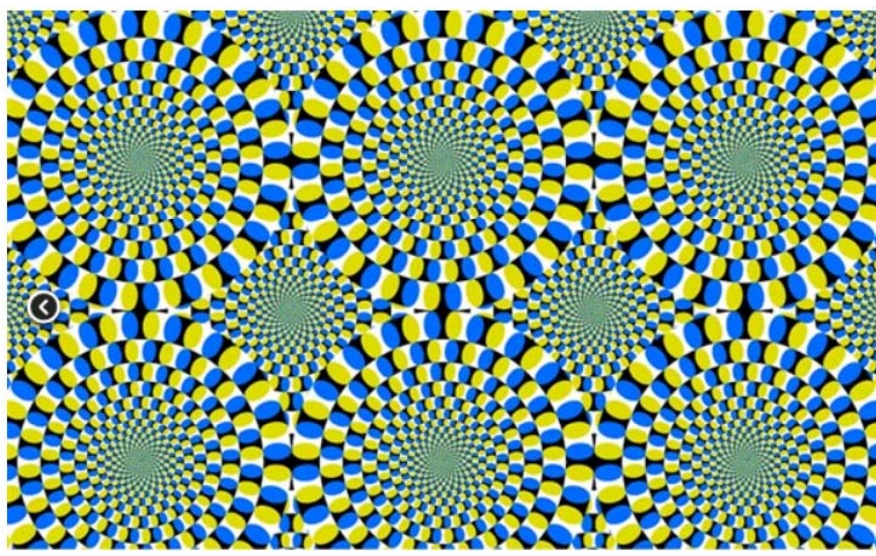


Catch the black spot

IF AN IMAGE SAYS MORE THAN 1000 WORDS, HOW MANY ARE TRUE?



You or Me?



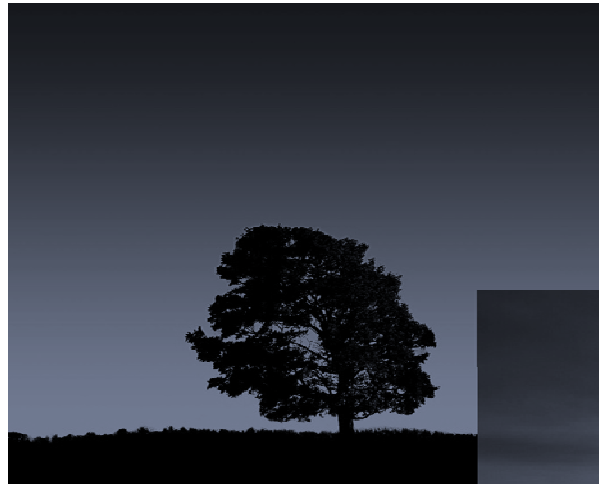
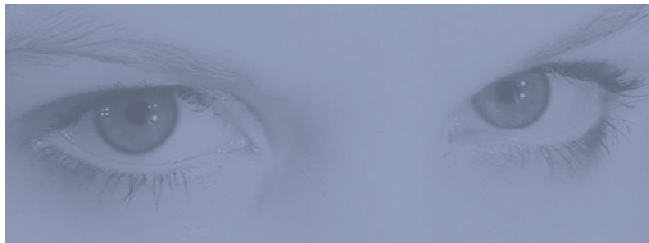
Circles or spirals?

LIFE IS colorful...

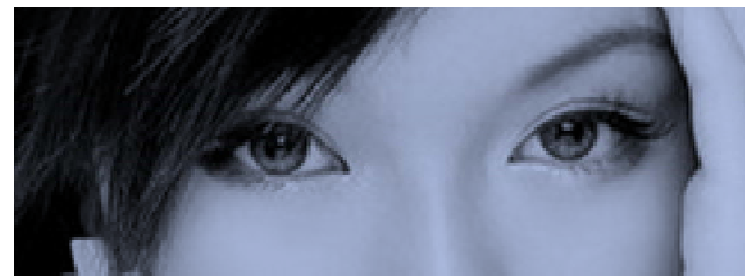


# LIGHT IS colorful... and polarized

We are polarization-blind...

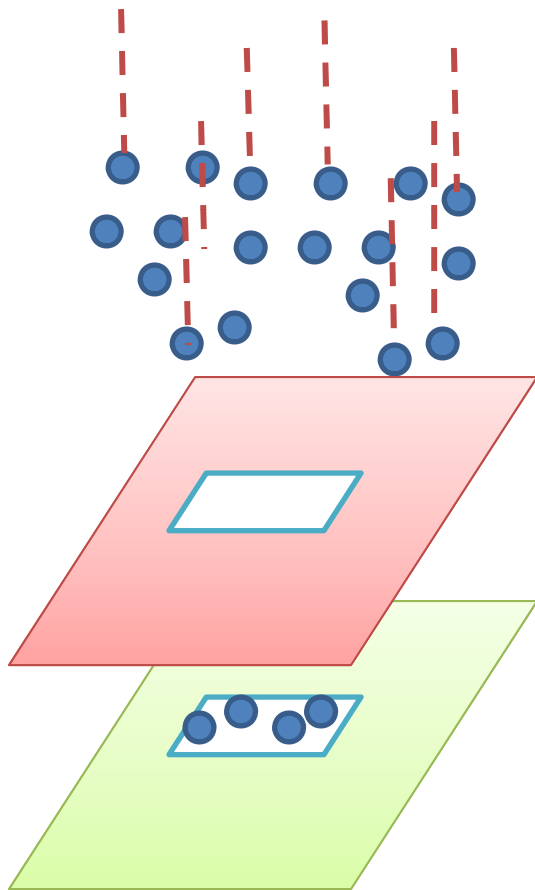


What else could we see?



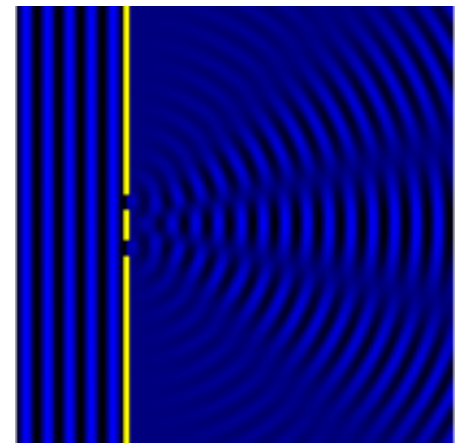
# LIGHT IS ALSO A WAVE...

## Particles



...  
“shadows”  
from  
particles  
**OR**  
waves  
are  
very  
**different**

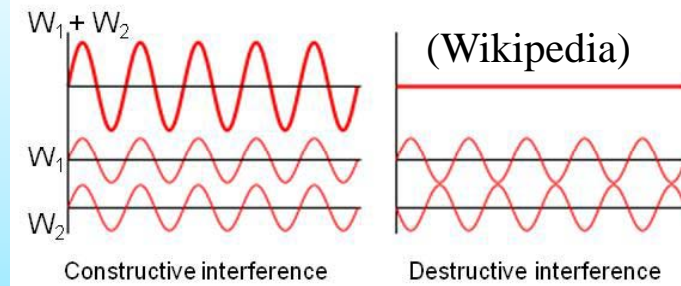
## Waves



Wikipedia: Interference/  
diffraction

# WAVE ADDITION → INTERFERENCE

Waves can add constructively or destructively



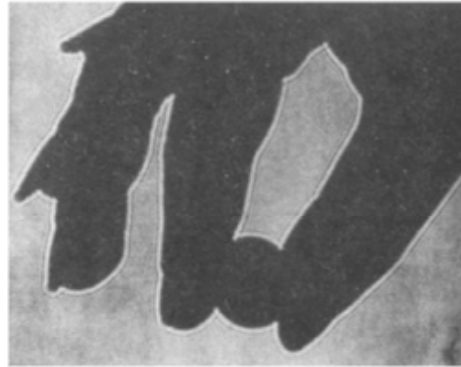
**Measuring** is the process of comparing: how many “meters” fit in this classroom?



Using light we compare two waves by **interference**  
Uses in : astronomy, metrology, oceanography, seismology, spectroscopy, quantum-, nuclear-, particle- physics, etc.

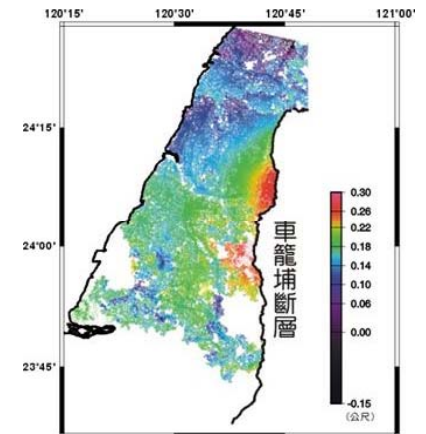
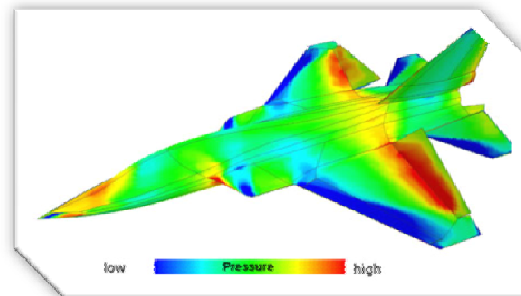
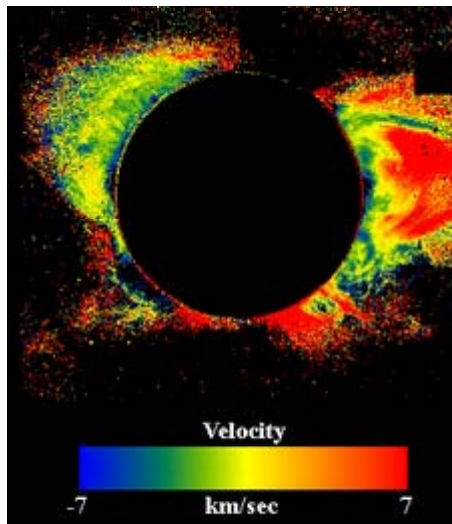
# WAVE ADDITION → SPECIAL IMAGES

Put your thumb and index fingers close together... you see a gap, 1/2 a gap, or ...?



Most of the times this effects is small

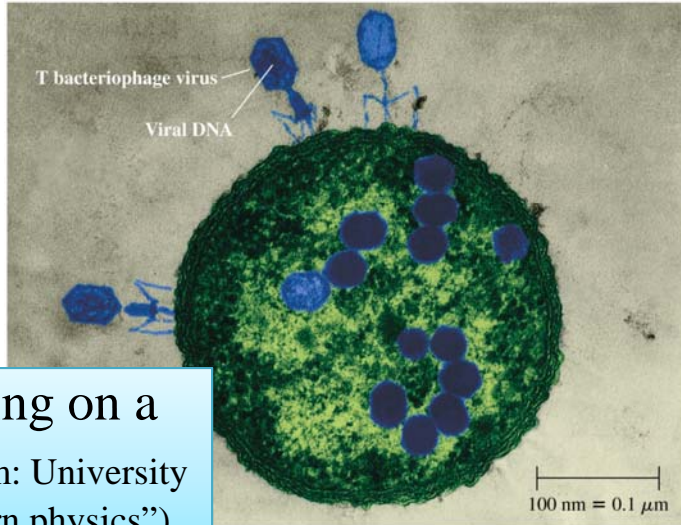
Many times this effects is very useful



Coseismic deformation of Chi-Chi earthquake from Differential Interferometry.

# SCIENCE ENABLES IMAGES FROM...

## Electrons



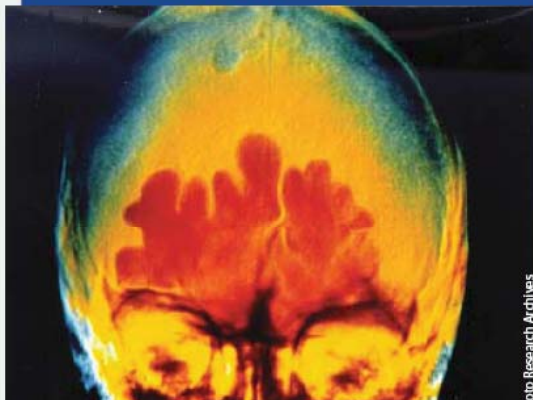
Viruses landing on a bacterium (From: University physics with modern physics")

## Sound



## Magnetic effects

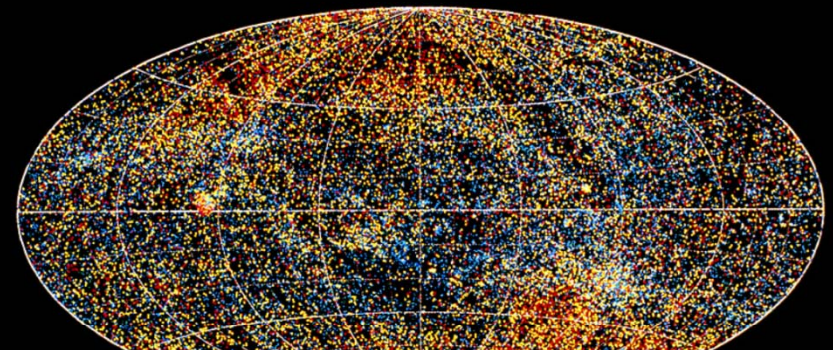
### MRI – IMPROVING DIAGNOSIS



- More than 60 million non-invasive MRI scans per year
  - MRI grew out of basic research on atomic nuclei
- NIH, NSF, and DOE funded research from the 1970s to the 1990s*

Source: AIP

## X-rays



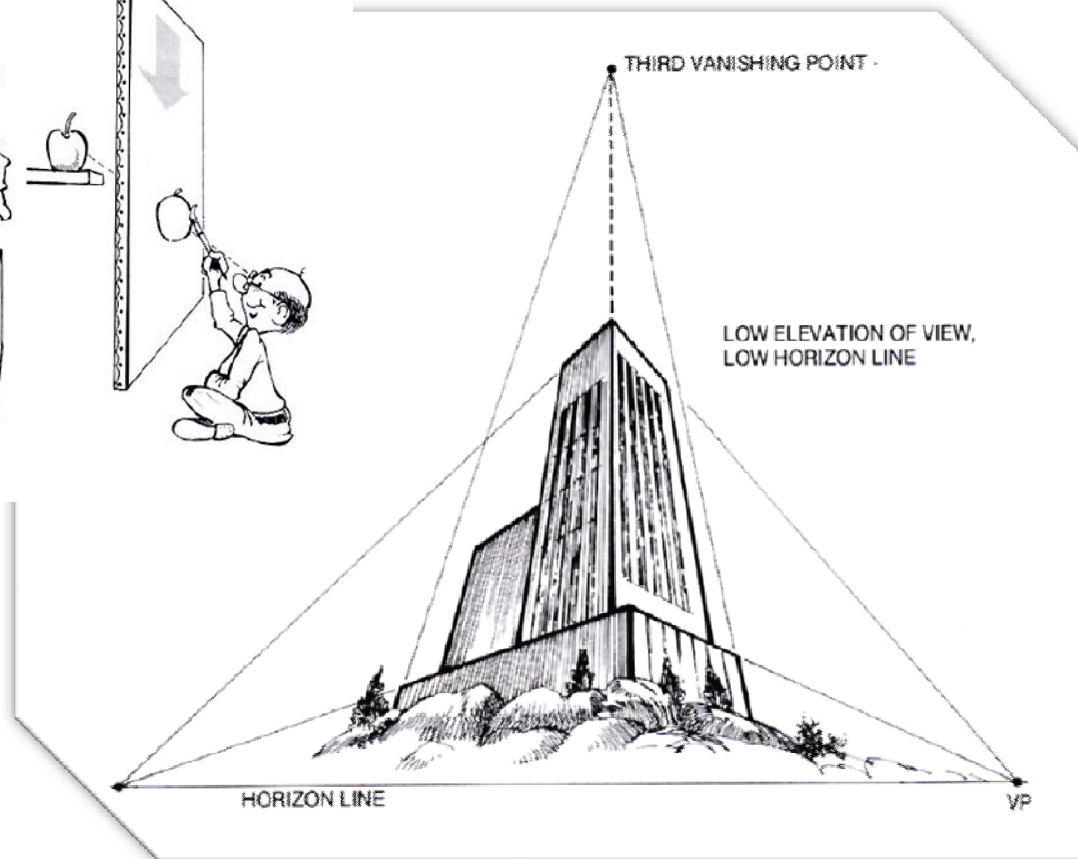
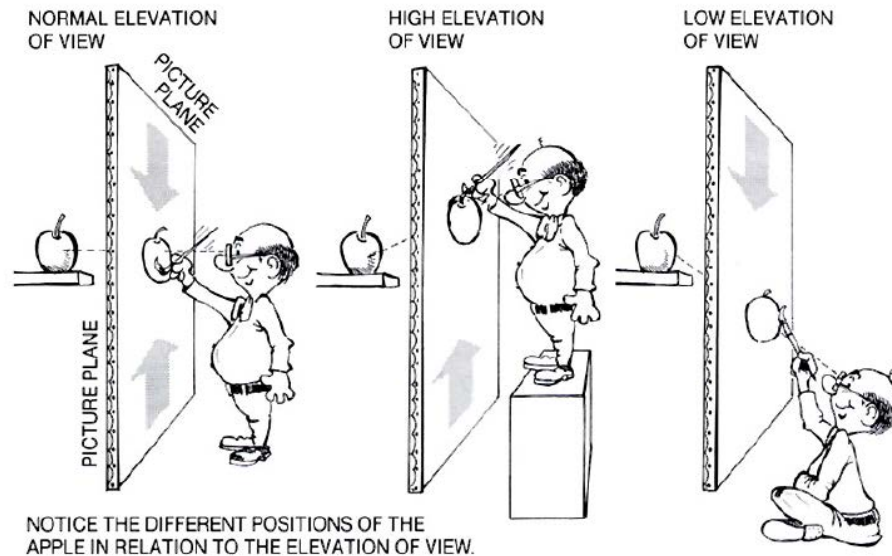
### 50 years of X-ray astronomy

<http://www.bbc.co.uk/news/science-environment-19096811>



# ART AND IMAGES

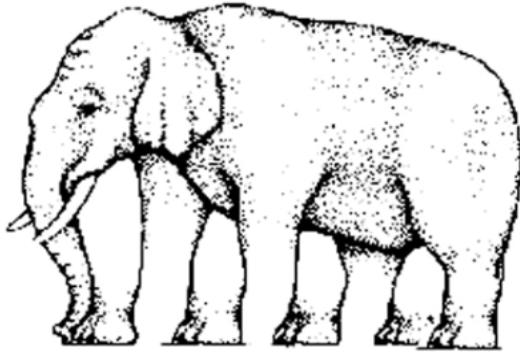
The choice of *viewing-point* and *perspective* can add powerful dramatic device



# IMAGES FOR MASS COMMUNICATION

## Social, cultural and legal impact of images





IF AN IMAGE SAYS MORE THAN  
1000 WORDS,  
HOW MANY SHOULD BE TRUE?

## About Misleading Advertisements

### USA Federal Trade Commission.

Skechers Will Pay \$40 Million to Settle FTC Charges That It Deceived Consumers with Ads for "Toning Shoes" [Link](#)



Get beautiful

Loose weight

Get healthy

Buy property

See also:

- The Advertising Standards Authority of Singapore ([ASAS](#))
- Australian Competition & Consumer Commission ([ACCC](#))

## **Recommended Reading:**

- Graham Saxby. “The science of imaging : an introduction” Bristol ; Philadelphia : Institute of Physics Pub., c2002.
- Zenon W Pylyshyn.”Seeing and visualizing: it's not what you think”, Cambridge, Mass. MIT Press, c2003.
- Edwin Abbott, “Flatland: a romance of many dimensions” Oxford; New York: Oxford University Press, 2006.
- F. Cucker “Manifold mirrors”, (forthcoming book).
- George . C Christie. “Philosopher Kings? The Adjudication of Conflicting Human Rights and Social Values” Oxford University Press 2011
- Rhona K. M Smith, “Textbook on International Human Rights” Oxford University Press 2010

## Recommended Online Resources:

- [videorecording] “Understanding our five senses. Seeing is believing, seeing and sight” Atlantic Beach, FL : Jaguar Educational, c2002.
- [videorecording] “Seeing with electrons” BBC; Milton Keynes, England : Open University Educational Enterprises, c1994.
- United Nations: <http://www.un.org/documents>
- International Court of Justice:  
<http://www.icj-cij.org/homepage/index.php?lang=en> (English Version)  
<http://www.icj-cij.org/homepage/ch> (Chinese Version)
- International Law Commission website:  
<http://www.un.org/law/ilc/index.htm>
- Office of the (UN-) High Commissioner for Human Rights:  
<http://www.ohchr.org>
- European Parliament:  
[http://www.europarl.europa.eu/news/public/default\\_en.htm](http://www.europarl.europa.eu/news/public/default_en.htm)