VELOCITY, ENERGY, AND MATTER

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Supplementary Material for
PHY 3305 (Modern Physics)
Harris Ch. 2.6-2.7

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REVIEW

- We got our hands dirty with relativity
  - life of the muon
  - "twins paradox"
- Started discussing motion
  - the Doppler Shift

BINOMIAL EXPANSION

$$(a+x)^n = a^n + na^{n-1}x + \frac{n(n-1)}{2!}a^{n-2}x^2 + \frac{n(n-1)(n-2)}{3!}a^{n-3}x^3 + ...$$

(where x² < a²)

If a=1 and x<<1, just study the first 2-3 terms:

$$(1+x)^n = 1 + nx + \frac{n(n-1)}{2!}x^2 + ...$$

LEGENDARY EQUATION

$$E=mc^2$$

# LIGHTBULB WEIGHT LOSS

75W

E=MC²

E=MC²

Normal

Parkinson

Pre

Post
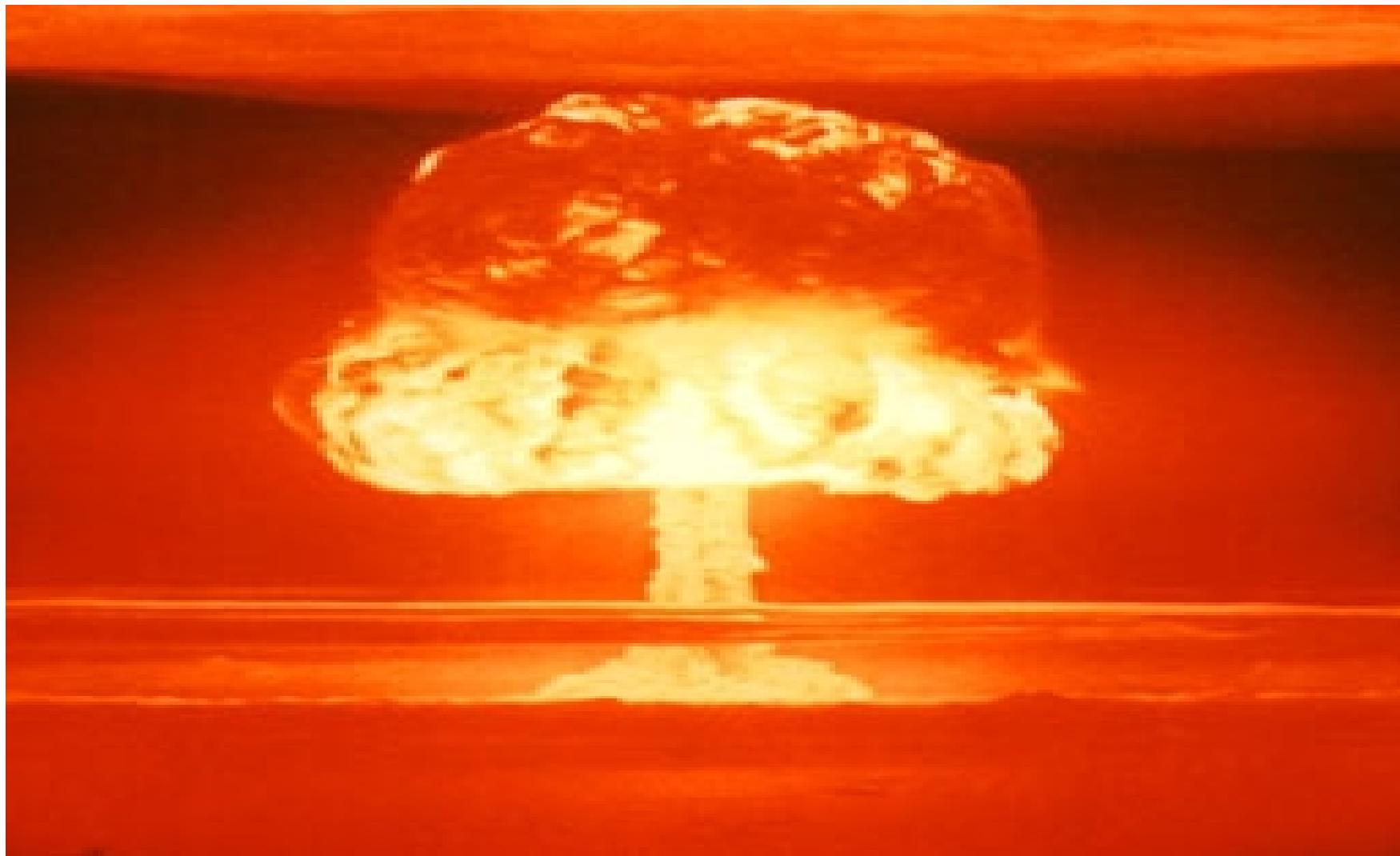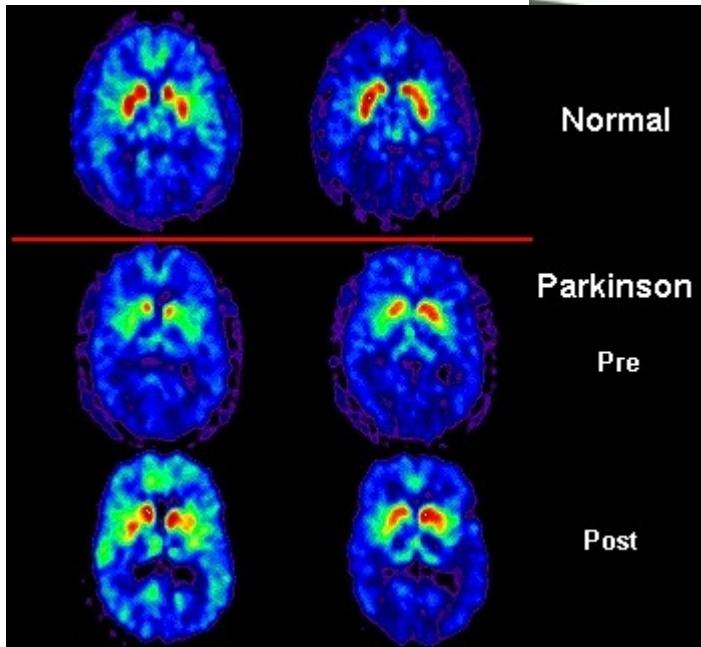
PET
Scanner

E=MC²

Fermi National Accelerator Lab:

WAVE PROPERTIES

/home/sekula/Documents/Notebooks/ModernPhysics/wave-interference_en.jar

http://phet.colorado.edu/simulations/sims.php?sim=Wave_Interference

LIGHT AS A WAVE

Light Diffraction by a Razor Blade
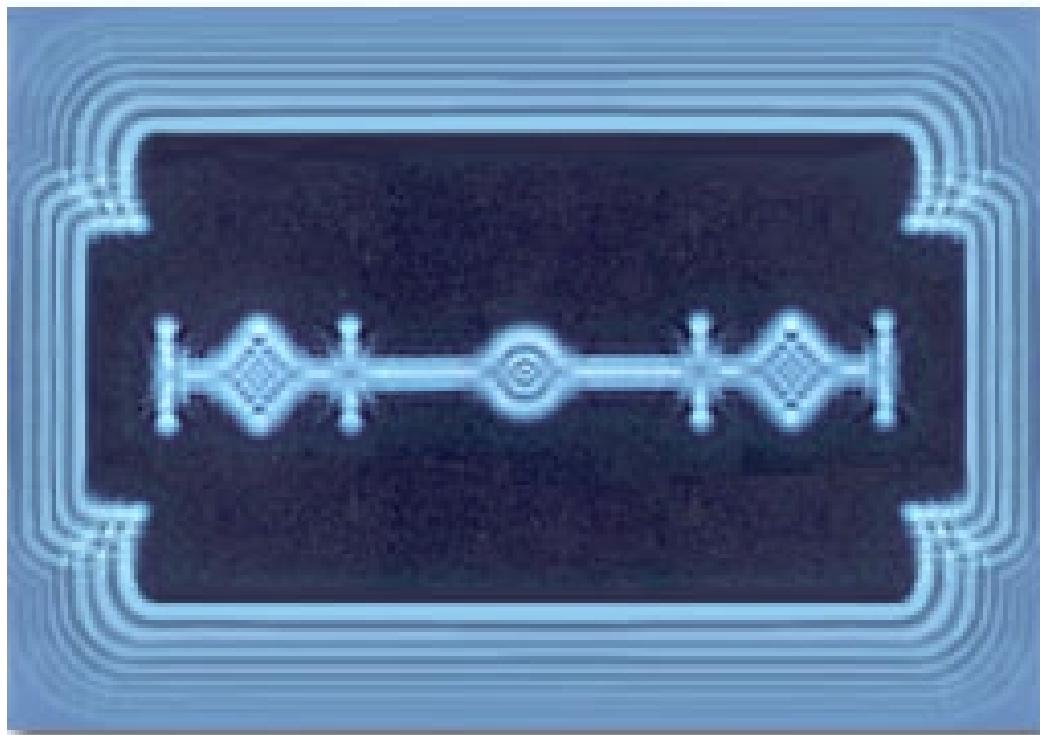
Figure 2
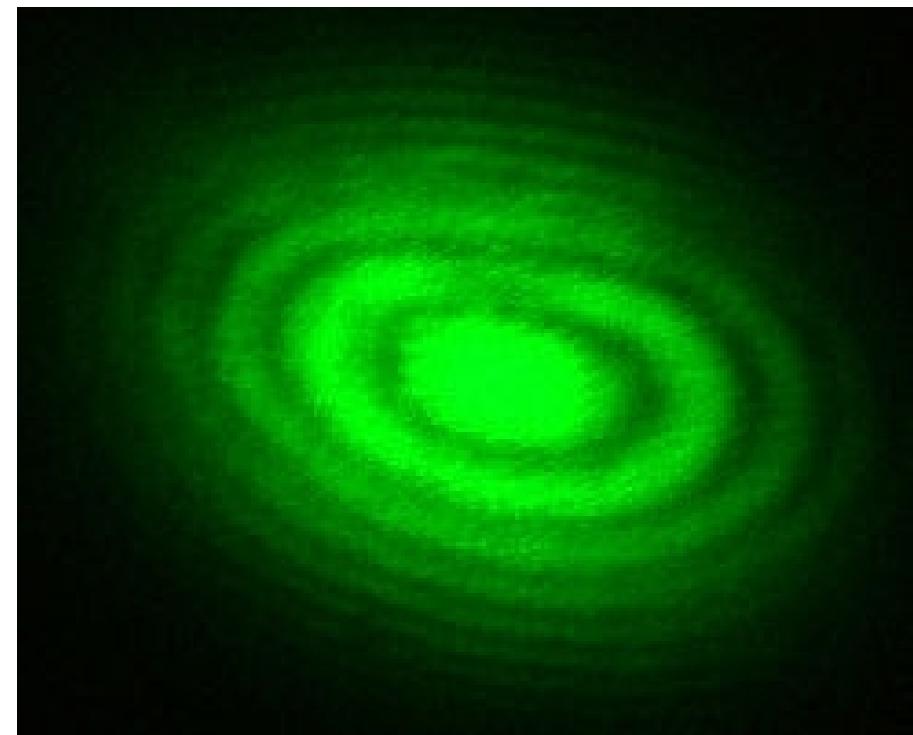
Interference by two laser beams

NEXT TIME

- What is light . . . really?

- Particle properties of radiation

- So which is it - waves or particles?