

MATTER AS WAVES

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(2/4/2010)

Supplementary Material for
PHY 3305 (Modern Physics)
Harris, Ch. 3.6, 4.1-4.2

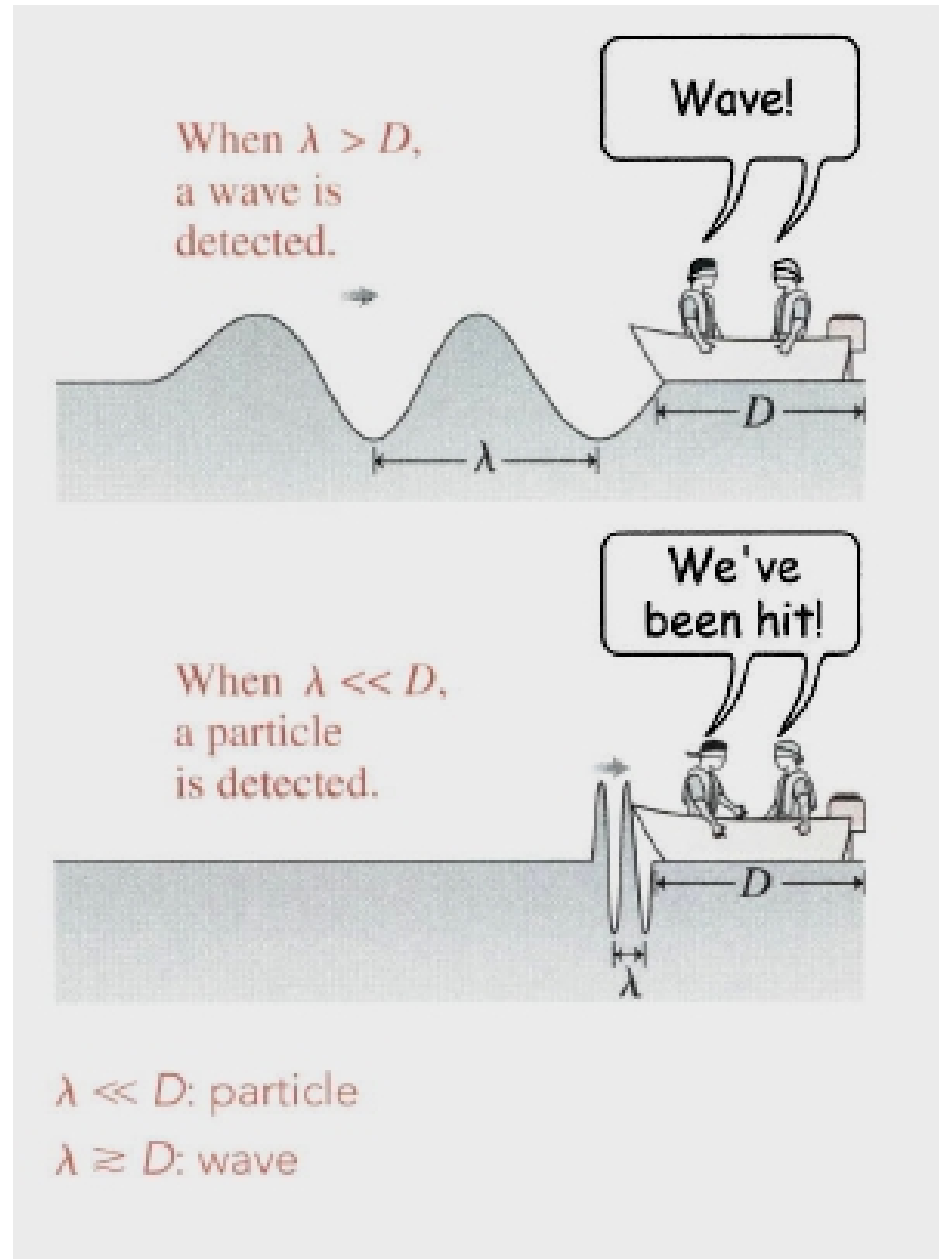
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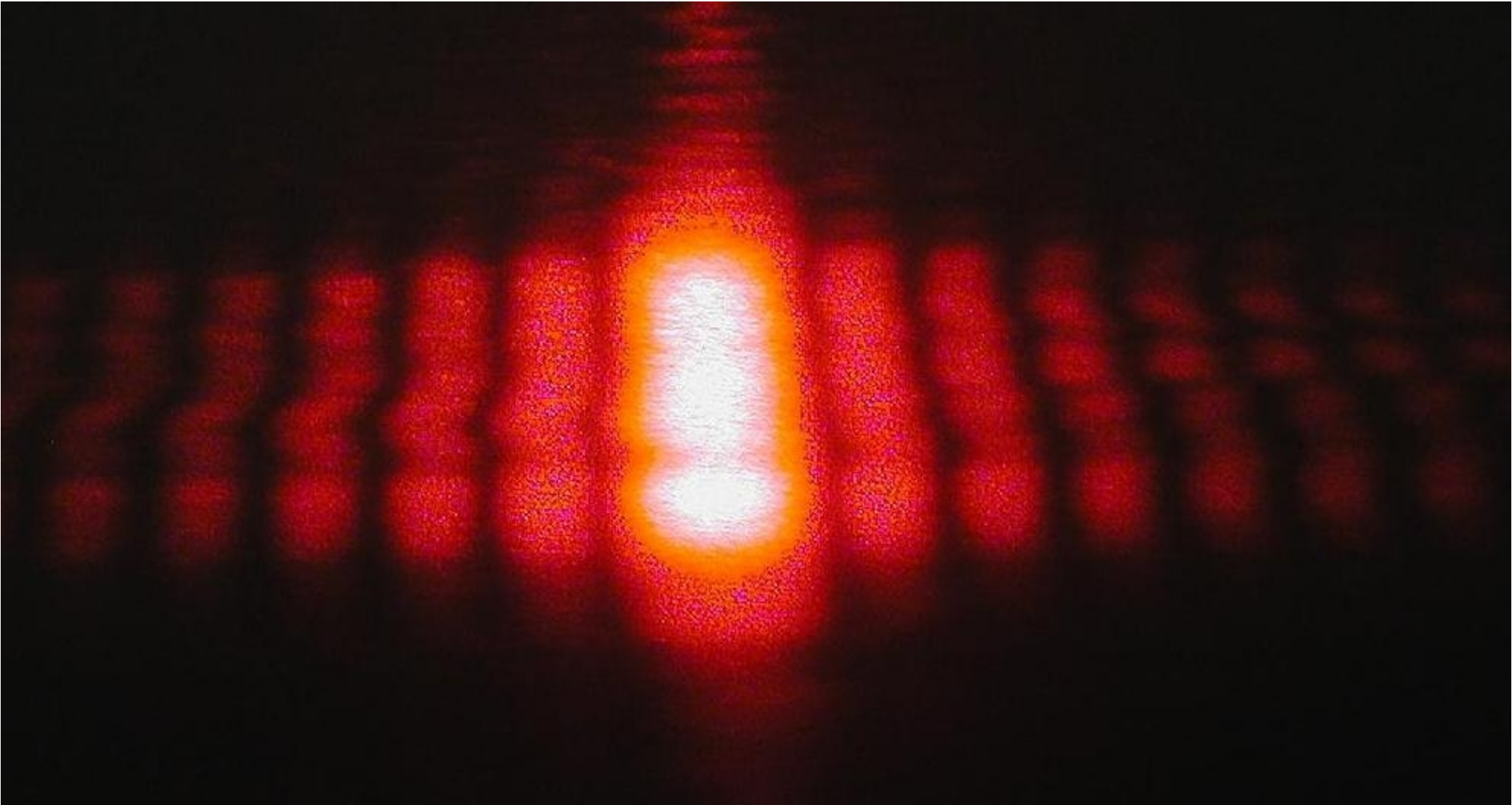
REVIEW

- Discussed properties of waves and particles
- Tried to apply the wave hypothesis of light to
 - blackbody problem
 - photoelectric effect
- Treating light as a particle helped explain these phenomena
- Correspondence Principle
- So which is it?
 - Is light a particle or a wave?

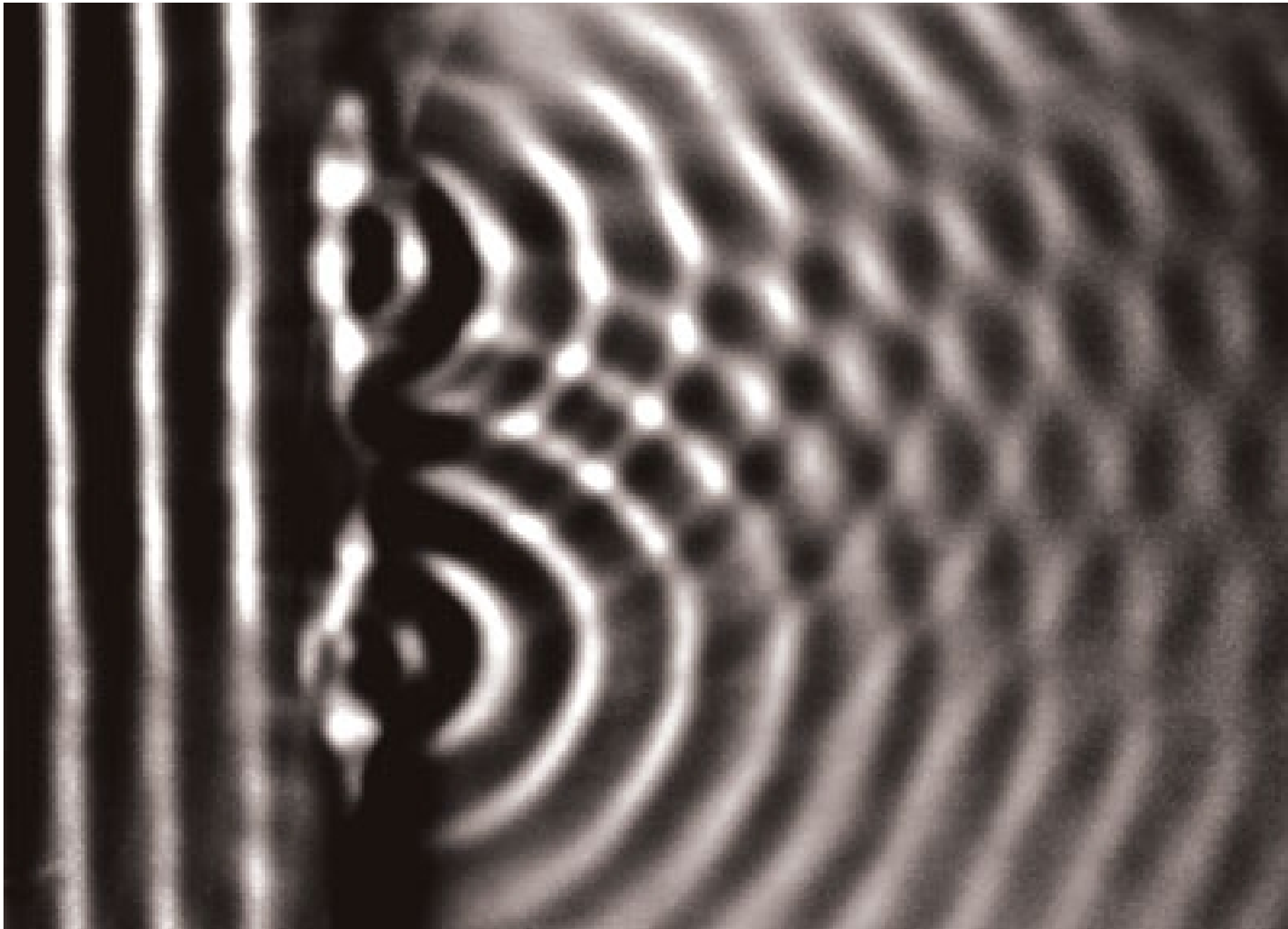
BOAT ON THE WATER



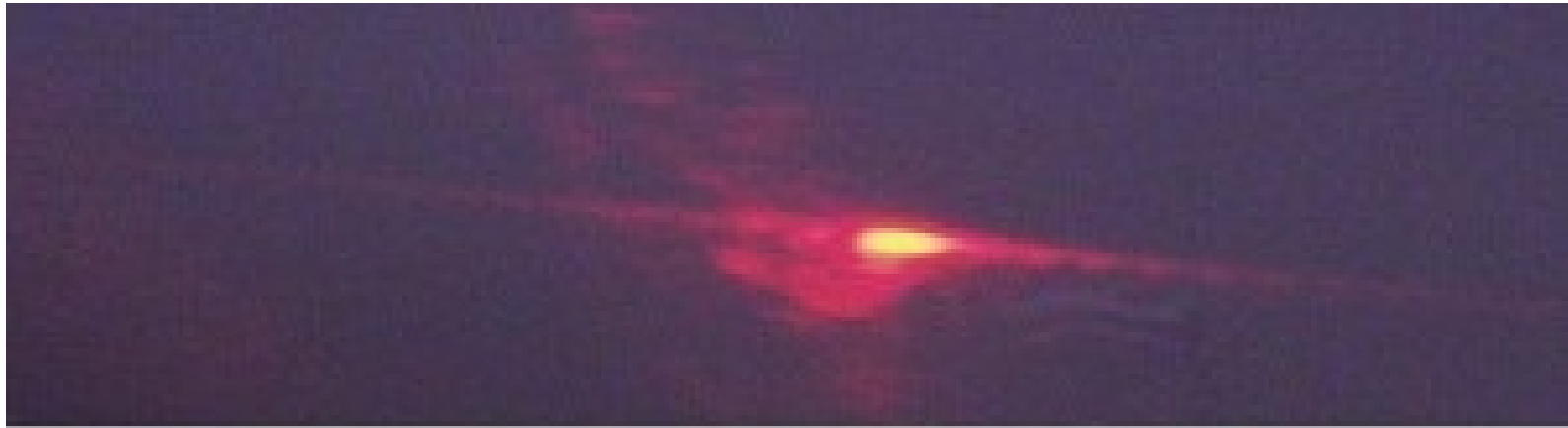
SINGLE-SLIT DIFFRACTION



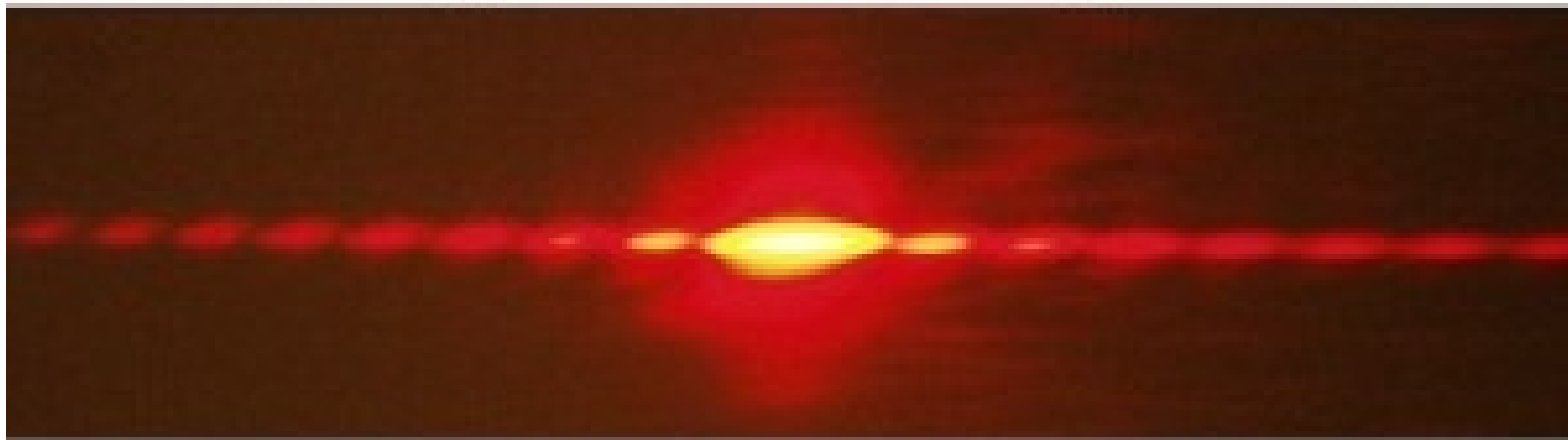
DOUBLE-SLIT DIFFRACTION (WATER)



DOUBLE-SLIT DIFFRACTION (LASER)



Pattern produced from a single slit.



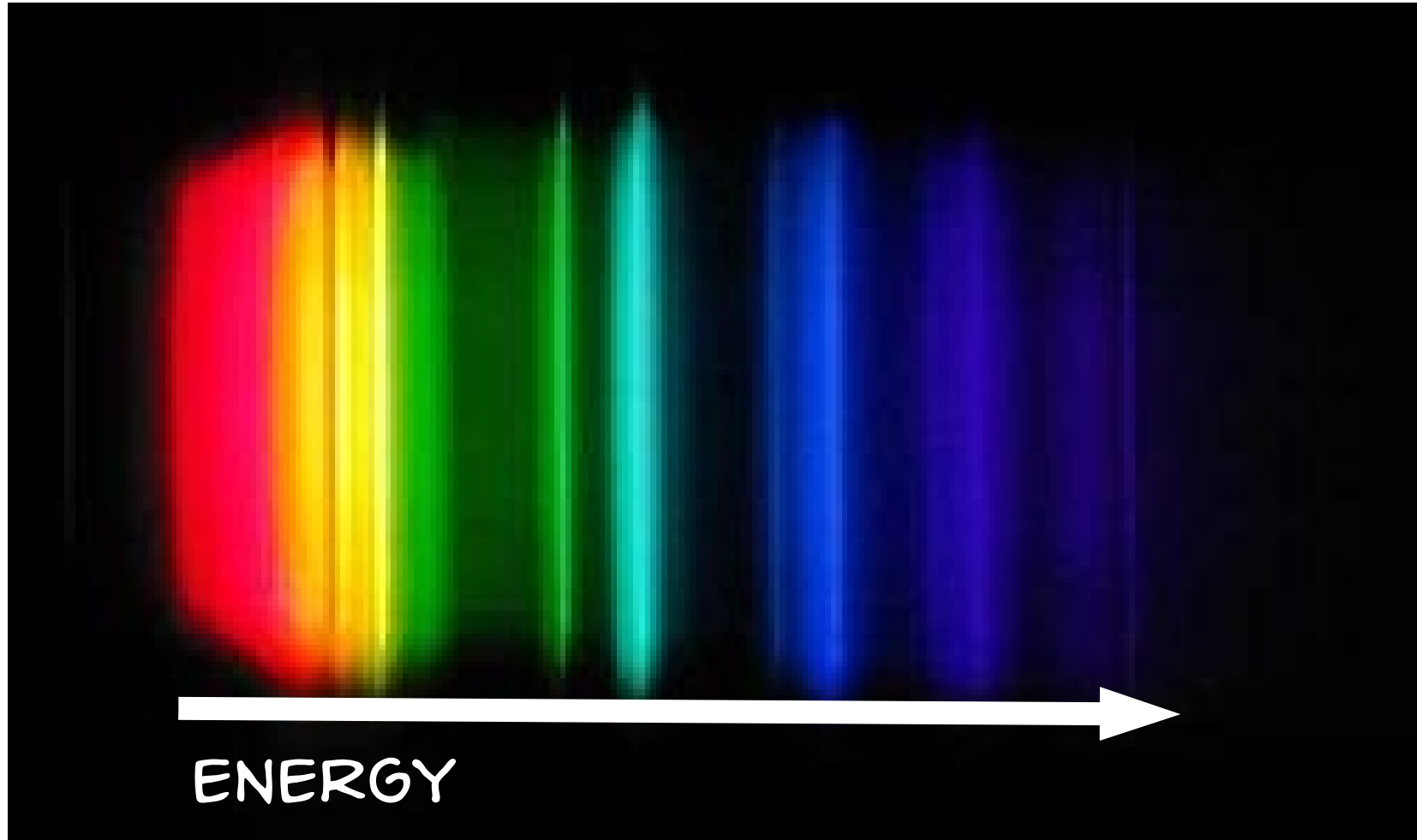
Pattern produced from a double slit.

DOUBLE-SLIT EXPERIMENT

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

http://phet.colorado.edu/sims/quantum-wave-interference/quantum-wave-interference_en.jnlp

SODIUM LAMP LIGHT: DISCRETE ENERGIES



LOUIS DE BROGLIE



NEXT TIME

- Matter waves: what is oscillating?
- Describing quantum behavior - the Shroedinger Wave Equation
- I will send around the reading in e-mail