LIGHT!!
Light Properties

- Light travels at the speed of light ‘c’
- \( C = 3 \times 10^8 \text{ m/s} \)
- Or 190,000 miles/second!!
- Light could travel around the world about 8 times in one second
What is light??

- Light is “made” out of photons
- Photons can be considered a particle and a wave!!
- What does that mean?
- A photon is a “wave packet”
- A photon is a “light particle”
Electromagnetic Radiation and You

- Light is sometimes called E-M radiation
- All things emit E-M radiation
- You emit Infra Red radiation (heat)

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# The Visible Spectrum


<table>
<thead>
<tr>
<th>Color</th>
<th>Wavelength (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td>620-750</td>
</tr>
<tr>
<td>orange</td>
<td>590-620</td>
</tr>
<tr>
<td>yellow</td>
<td>570-590</td>
</tr>
<tr>
<td>green</td>
<td>495-570</td>
</tr>
<tr>
<td>blue</td>
<td>450-495</td>
</tr>
<tr>
<td>indigo</td>
<td>420-450</td>
</tr>
<tr>
<td>violet</td>
<td>380-420</td>
</tr>
</tbody>
</table>
Wavelength and Frequency

- Wavelength is the distance between two peaks (or troughs)
- Frequency is how frequently the waves occur
- A longer wavelength means a lower frequency
- A shorter wavelength means a higher frequency

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The speed of light

- The speed of light ‘c’ is equal to the frequency ‘\( \nu \)’ times the wavelength of light ‘\( \lambda \)’
- Frequency is measured in Hertz (Hz)
- Hz = 1/ second
- Wavelength is measured in units of length
- \( c = \nu \times \lambda \)
Energy

- The shorter the frequency, the higher the energy of the light!
- $E = \hbar \nu$ where ‘$\hbar$’ is a constant
- $\hbar = 6.626 \times 10^{-34}$ Joules *second
- Energy is measured in Joules, ‘J’
- $J = \text{Watts/m}^2$
- Higher energy = high frequency = short wavelength!!
Two Girls in the IR

Is this in “true color?”

Extra Credit Opportunity: Wein’s Law

- What is Wein’s Law?
- Go to: http://en.wikipedia.org/wiki/Wien%27s_Dispacement_Law
- What’s wrong with the plot in the upper right hand side?