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|---|---|---|
| **Today** | **Ch 24** Electro-magnetic waves **2nd ½** | **HW21** |
| **Friday** | **Ch 25** Geometric Optics: Reflection | **HW22** |

**24.3 The Doppler effect**

- **Redshift**
- **Blueshift**

- **Applications**
  - **Thermodynamics**
    - **laser trapping**
  - **Astronomy**
    - **Gas cloud**
    - **Expansion of the Universe**

**24.4 Polarization**

- **polarization**
- **Transmission axis**
- **linearly polarized**
- **Malus' Law**

**Example 1:** Say I lay a polarizer on the overhead projector, at 20° relative to the horizontal. If the light from the overhead projector's light bulb produces 10,000 W/m$^2$ light at the polarizer, what is the intensity of light transmitted?

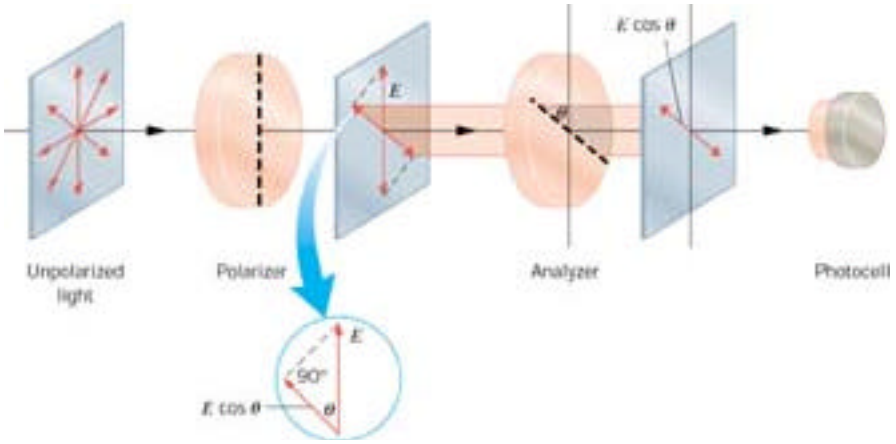
- **2 sheets.**
  - **Demo**

**Example 2** Picking up where we left off on Example 1, say we put a second polarizing sheet on top of the first. We rotate it to 60° off the horizontal. What is the intensity of the light passed?

- **Demo: 3 sheets.**
- **Rotators**
- **Polarization in Nature**
  - **Demo: Cloudy water**
  - **Demo: Sun light**

**HW 22 Ch 24 Pr. 34, 36**

34. Unpolarized light whose intensity is 1.10 W/m$^2$ is incident on the polarizer in the Figure. (a) What is the intensity of the light leaving the polarizer? (b) If the analyzer (i.e. another polarizer) is set at an angle of 75° with respect to the first polarizer, what is the intensity of the light that reaches the photocell?




36. For one approach to this problem, consult Interactive LearningWare 24.1 at www.wiley.com/college/cutnell (6th Edition). For each of three sheets of polarizing material shown in the drawing, the orientation of the transmission axis is labeled relative to the vertical. The incident beam of light is unpolarized and has an intensity of 1260.0 W/m$^2$. What is the intensity of the beam transmitted through the three sheets when $\theta_1$ = 19.0°, $\theta_2$ = 55.0°, and $\theta_3$ = 100.0°? For the angles, you want to use the difference between the polarization of the light and the transmission axis of the polarizing plate. This is not *exactly* the angles given in the problem.