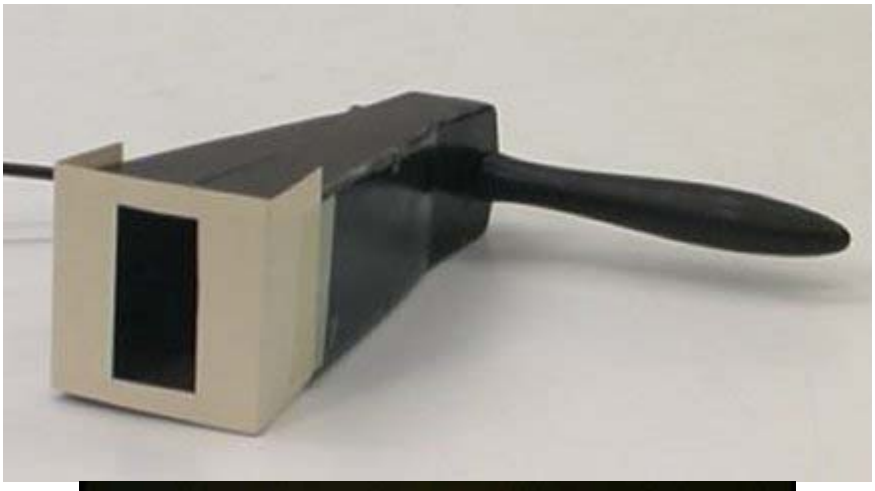
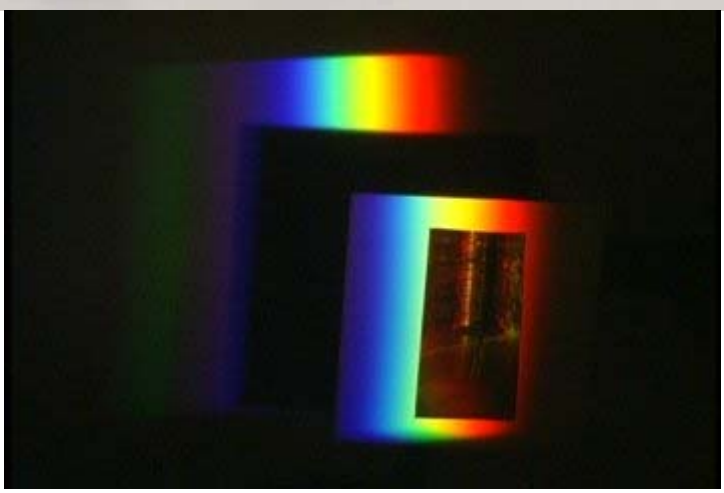
Question #247

This is a sort of follow-up to the question from last week. This time, we will use the device seen in the photograph at the left, called a thermopile. This thermopile has been connected to an audio oscillator so that when it is aimed at an object it emits an audible tone that is higher in frequency the hotter the object at which it is aimed. For example, by clicking your mouse on the photograph of the thermopile you will hear the frequency rise as it is aimed at Dan's head, clearly demonstrating that Dan's head is warmer than the walls and floor of the building.





Now suppose that it is positioned in the red region of the spectrum of the carbon arc lamp from Question #246, as seen in the photograph at the right above. Note that a paper mask with a small rectangular opening limits the range of frequencies (or wavelengths) of light that is allowed to enter the thermopile. In the photograph the radiation to which the thermopile is responding cover a band in the red-orange-yellow region, as can be seen in the photograph. What will happen to the frequency of the tone produced by the oscillator as it is moved slowly off the red end of the spectrum?

- (a) The frequency will decrease, demonstrating that there is less heat radiation off the end of the spectrum.
- (b) The frequency will increase, demonstrating that there is more heat radiation off the end of the spectrum.

- (c) The frequency will remain about the same, showing that the heat from the lamp, unlike the light, is distributed about equally around the demonstration.

Click here for Answer #247 after April 3, 2006.

Question of the Week

Outreach Index Page

Lecture-Demonstration Home Page

For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.