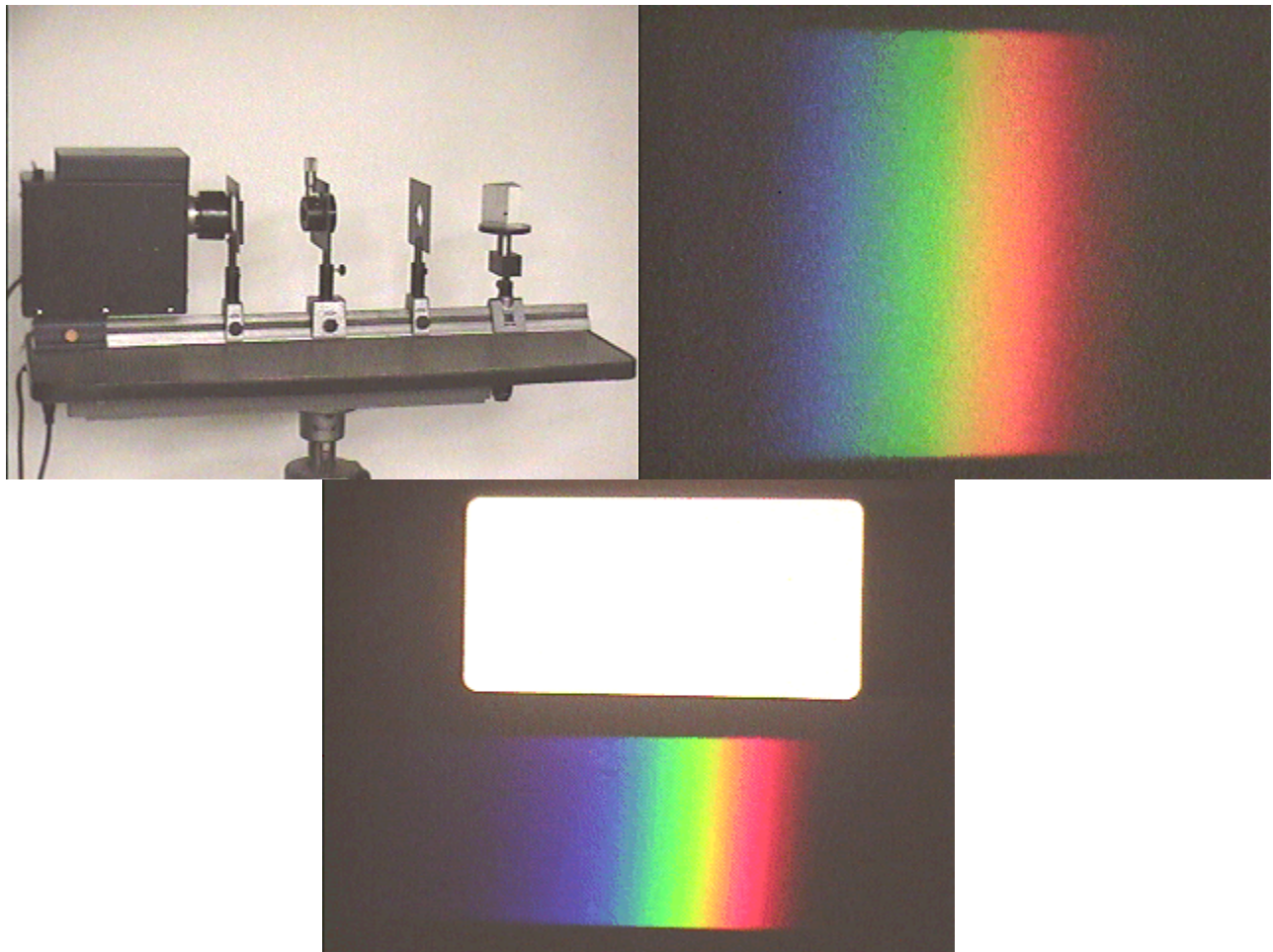


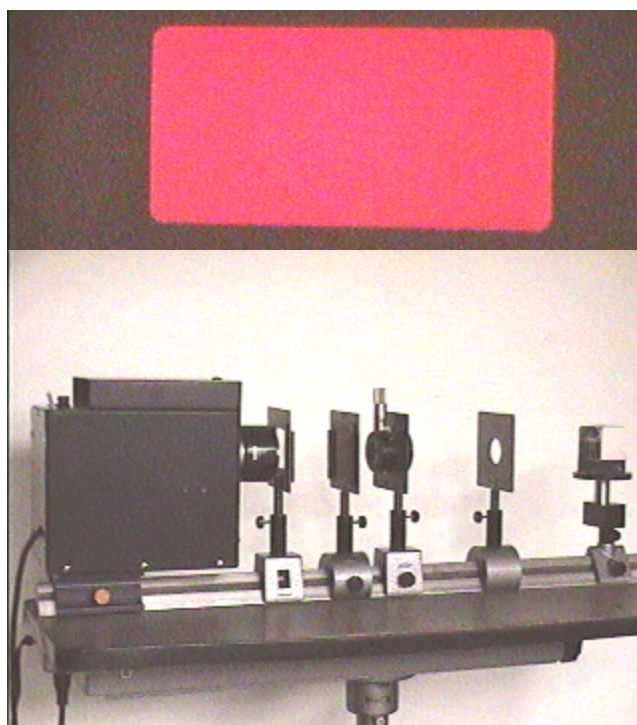
Question #192

This week we begin a three-part series on color filters with a reasonably straightforward question using a basic experimental setup.

Shown below in the photograph at the left is a setup to display the spectrum of white light: a quartz-halogen white light source with a condenser lens; a cylindrical focusing lens that casts its tall, narrow image at the point of the next element, an object-defining slit for the optical system; a lens that focuses the image of the slit on a distant screen; and a prism to disperse the colors. This optical system produces a well-defined spectrum of white light, shown in the photograph at the center. The photograph at the right is the color of the (white) light whose spectrum is seen in the center, along with its spectrum.



Consider now the light from a high-quality *positive* red filter, which is seen in the photograph below. The color patch is obtained by placing the filter over a rectangular baffle on an overhead projector. The spectrum is obtained by placing the red filter just in front of the slit in the spectrum experiment, as seen in the photograph below the color patch.



The question is what the spectrum of this filter looks like: that is, the spectrum that corresponds to this color of light, just as the white light and its spectrum go together as seen above. You are to explain what the spectrum will look like with the help of some possible hints given below.

The spectrum will:

- (a) be just like the white light spectrum above.
- (b) be like the white light spectrum above with the red missing.
- (c) be like the spectrum above with everything but the red missing.
- (d) be like the spectrum above with the red stronger than other colors.
- (e) be like the white light spectrum above with some other color missing.
- (f) not exist because the light is not white.

Click here for [Answer #192](#) after October 4, 2004.

[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](#).