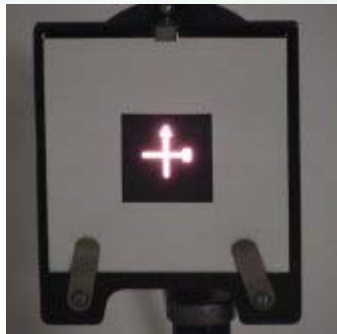


## Question #304

Shown in the photograph at the left below is an optical system consisting of a source, a 60cm focal length convex lens positioned 120 cm from the source, and a 30cm focal length convex mirror positioned 60 cm from the lens. A photograph of the source, viewed from left to right, is shown at the right below.



The challenge this week is to identify and describe all of the images sequentially produced in this system as the light progresses, and to describe how they can be seen. For example, the image of the original object (the lighted cross) created by the lens may be located somewhere to the left of the lens in the photograph above, it will be either real or virtual, either upright or inverted, and have some as yet unknown magnification. You might be able to see that image by placing a small screen at the image point, but you may also have to do something else in order to actually see the image.

A nice way of doing all this is to use carefully constructed ray diagrams, thus avoiding any complicated calculations. Our answers will include both ray tracing and calculation to determine the solutions to this problem, as well as photographs of all objects and images.

For each image, do the following:

- (a) State the location of the image.
- (b) Characterize the image as real or virtual.
- (c) Characterize the image as upright or inverted.
- (d) Determine the magnification of the image.
- (e) Give a precise procedure for actually viewing the image.

Click here for [Answer #304](#) after February 4, 2008.

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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](#).