

EE 119 Lab 2: Lenses and Images

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Objective

The purpose of this lab is to observe how images are formed with simple lens configurations.

Experimental Setup

A bright, white light source is used to project an image through various lenses onto a screen. The object can be a simple diagram on a cut-out transparency (i.e. the Cal logo, etc.).

Experiment

- (a) Screen is $3f$ from the object. Where will we need to put the lens to get a focused image?
- (b) Lens is placed $2f$ from the object. Where will the image form? What will it look like?
- (c) Lens is placed just over one focal length from the object. As the lens is slowly brought closer to the object, what happens to the image?
- (d) As the lens is moved further and further away from the object, what will happen to the image?
- (e) Two-lens system: First lens is placed $2f$ from the object; Screen is $8f$ from object; where should we put lens to get an image? What will it look like?
- (f) Lens is placed at $0.7f$ from object so that no real image is formed. If we put another lens of the same focal length right next to the first one, will there be an image? If so, where?
- (g) Given Bessell's Method for finding the focal length of a lens
$$[f = (L^2 - D^2)/4L],$$
determine the focal length of an unknown lens. (L is a fixed distance from object to screen; D is distance between two positions of a lens that give focused images.)
- (h) Why are the images seen in this lab so fuzzy?