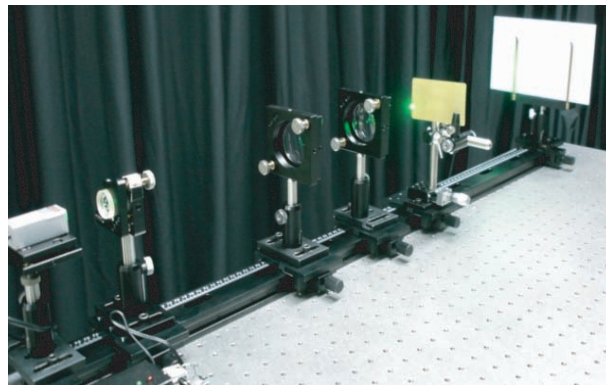


## Thin-lens Imaging



### Application

- Knife-edge Focal-length Measurement
- Single-lens Imaging
- Laser-Beam Expansion
- Two-lens System

### Purpose of the Experiment

The primary purpose of this experiment is to teach the principle of a single imaging lens and a multi-lens imaging system. This experiment also teaches the basic skills of creating an expanded and collimated laser beam, and measuring the focal length of a lens by using the knife-edge technique.

### Description of the Experiment

**Laser beam expansion:** This technique is often needed in optics experiments. In this experiment, we use a negative lens and a positive lens to form a confocal telescopic system. Expansion ratios of different focal-length combinations are verified in the experiment.

The knife-edge technique is a classic means for measuring the focal length of a lens. A unique knife-edge assembly is designed for measuring the focal lengths of several positive lenses.

**Single-lens imaging:** This part of the experiment verifies the imaging formula of a thin lens.

**Measurement of the focal length of a negative lens:** This part of experiment is accomplished by imaging the virtual image formed by the negative lens through a positive lens with a known focal length. The focal length of a negative lens is deduced from successive uses of the single-lens imaging formula.