BRDF Measuring System using an Ellipsoidal Mirror and a Projector
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Background:
- **Background**: measurement of reflection property for many applications such as computer graphics and inspection of painted surfaces.
- **Purpose**: fast and dense measurement of BRDF complex reflection.

**BRDF Measuring System**
- **Ellipsoidal Mirror**: All rays from one focal point reflect on the mirror and pass the other focal point.
- **Principle of the System**

**What is BRDF?**
- **BRDF (Bidirectional Reflectance Distribution Function)**
  - The ratio of outgoing radiance to incident irradiance
  - Depends on microscopic shapes

**Experimental Results**
- **BRDF Measurement of Real Object**
  - Isotropic reflection (3-parameter BRDF)
  - $90(\theta) \times 2(\phi=0,180) = 180$ images
  - 2 minutes x 10 times (for averaging) = 20 minutes

**Developed System**
- **Ellipsoidal Mirror**
  - Omni-directional observation
- **Projector**
  - Exclusion of mechanical drive

**Target material**
- Glossy Penny 2007
- Old Penny 1975