I. Light Reflection and Refraction at Plane Surfaces

1A-1 Reflection from a Plane Mirror

Objective: Angle of Incidence $\theta_i$ = Angle of Reflection $\theta_r$

Background:

- $\theta_i = \theta_r$

Sketch:

2. Light ray box (Sargent Welch 3550-A, green color case)

- V. Vertical slit aperture

- F. Filter (green)

- L. Plane-Convex lens $F = 18$ cm (collimates diverging rays from light box)

- M. Plane mirror (aluminum)

Method:
For two angles of incidence $\theta_i$, trace light rays reflected from
a plane mirror, and measure $\theta_i$ and $\theta_r$ with a protractor, 0.5° graduations, 0.1° resolution.

Drawing 2

Data: (See any tables on pages 2 and 3.)

Measurements 2

Results: (evaluation of data)

- Trial 1: $\theta_i = 31.2 \pm 0.4^\circ$, $\theta_r = 31.2 \pm 0.4^\circ$

- Trial 2: $\theta_i = 63.2 \pm 0.4^\circ$, $\theta_r = 63.2 \pm 0.4^\circ$

(Uncertainty based on beam misaligning and inability to mark beam center accurately.)

Conclusion: $\theta_i = \theta_r$ within experimental uncertainty.
LAW OF REFLECTION

TRIAL 1  STATION 4  GREEN

$\theta_i$: ANGLE OF INCIDENCE
$\theta_r$: ANGLE OF REFLECTION
Law of Reflection

Trial 2

\[ \theta_i = 3.2 \pm 0.4^\circ \]
\[ \theta_r = 3.3 \pm 0.4^\circ \]
\[ \delta = 3.7 \pm 0.4^\circ \]