

# CURVED AIR TRACK

## INTRODUCTION



This experiment is an adaptation of **The AIR TRACK** to simple harmonic motion. This air track is shaped as an arc of a circle of large radius in the vertical plane. Thus a glider on the track behaves like the bob of a simple pendulum of large radius and thus long period. This enables simple harmonic motion to be "slowed down" for more leisurely observation.

Moreover, any object placed on the moving glider is situated in an accelerating frame of reference. The experiment thus allows simple observation of motion of objects in such a frame.

## THE EXPERIMENT

- You might first wish to qualitatively observe the motion of the glider on the track.
- You can measure the radius of curvature of the track by raising an end by a known amount and then observing how much the equilibrium position changes.
- Once you know the radius of curvature measurement of the period of oscillation gives you enough information to measure the acceleration due to gravity,  $g$ .
- You may observe what happens to objects placed on the moving glider.

## POINTS TO CONSIDER

- What are the principal sources of error in this determination of  $g$ ?
- Are there any systematic errors that might influence this determination of  $g$ ?
- How do you explain the behaviour of a ball or a level placed on the moving glider? Would these behave the same if the track has some different shape. Would these behave the same if friction became a serious consideration in the glider motion?

(jv - 1988)