Stony Brook University

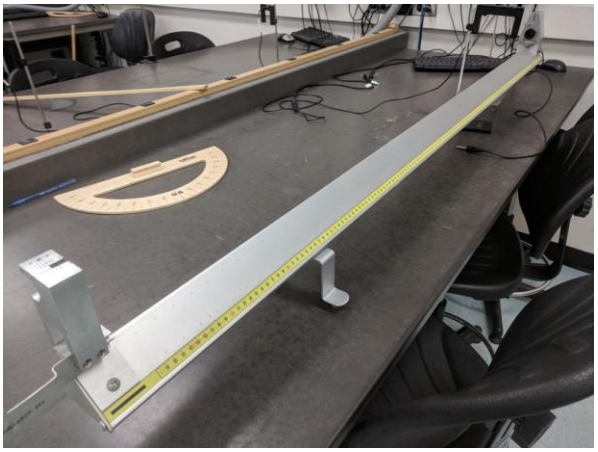
Department of Physics and Astronomy
Introductory Physics Laboratories
PHY 121

PHY 121 Air Tracks

Basics

https://shop.sciencefirst.com/daedalon/7544-precision-air-track-15m-long.html

The Daedalon Basic Air Track is tool to allow students to study motion in a low friction context. It requires an air source of ~ 26 liters/second at ~1.1 atmospheres (absolute) which is provided to all lab rooms from a central compressor.



To operate it:

i) You should hear the hiss of escaping air and feel the flow through holes in the top surface of the air track. Your TA will turn on the air compressor when you are ready to perform the experiment.
ii) Data collection will be done by photogates connected to the LabPro interface, controlled by Logger Pro software. Open the Logger Pro file for your experiment and answer "Connect" when prompted. The photogates should have a red LED light when their emitter/sensor pair is blocked (ie. something in the gate) and not when the gate is open.
iii) For help with photogate problems, see the Photogate Reference Document. The lab staff is happy to help.

Leveling the Air Track

For best results, the air track should be level. An angle will introduce changes in $E_{potential,\ gravity}$ which complicate your measurements.

To level the track:

i) Set a cart in the center of the track with no initial velocity (as small as possible).
ii) Observe the motion of the cart. If it tends to head toward one end of the track, that end is **too low**.
iii) You will need to adjust the leveling screw.

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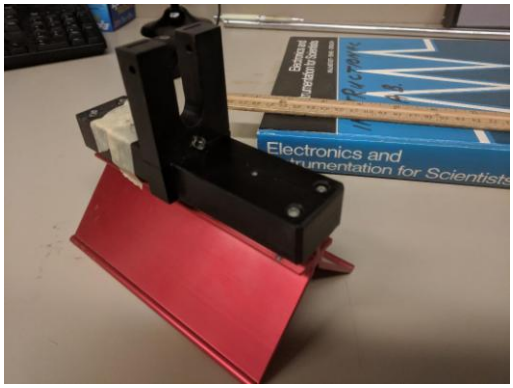
Thumb Screw, Spade top

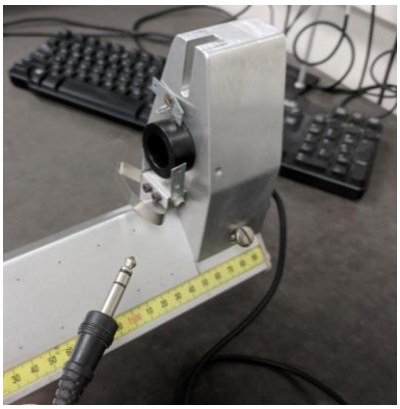
Wing Nut

Leveling the Air Track (continued)

iv) Turn the wing nut so that it loosens (ie. goes away from the aluminum plate). This will be counter-clockwise (ccw) from above.
v) Turn the thumb screw to raise or lower the end of the air track. Clockwise (from above) will raise that end; ccw (from above) will lower that end.
vi) After adjustment, test the cart to see if it runs to one end. If the cart stays in the center of the track, gently tighten the wing nut against the aluminum plate (cw from above). This will hold the proper adjustment.

Air Track Mounted Photo Gate





In our Conservation of Energy lab, we use a flashing LED mounted to the cart which is detected by a photosensor mounted to the end of the air track. The cart flashes when its photogate is blocked by the opaque sections of our "picket fence".

The air track mounted photo sensor must be connected to the LabPro to function. Its "banana plug" (shown in picture above) is attached to an adapter which then mates to the Dig/Sonic Input of the LabPro.

For the system to work, the LED on the cart must be facing the photosensor on the track.