

Experiment 7 ~ Conservation of Linear Momentum

Purpose:

The purpose of this experiment is to reproduce a simple experiment demonstrating the Conservation of Linear Momentum.

Theory:

The momentum p of an object is the product of its mass and its velocity:

$$p = mv$$

Momentum is a vector quantity, since it comes from velocity (a vector) multiplied by mass (a scalar). The law of conservation of momentum states that the total momentum of all bodies within an isolated system,

$$p_{\text{total}} = p_1 + p_2 + \dots$$

is constant. That is, if the total momentum has some initial value p_i , then, whatever happens later, the final value of the total momentum p_f must equal the initial value. So we can write the law of conservation of momentum like this:

$$p_f = p_i$$

Conservation of momentum is usually studied in problems that involve collisions. In this experiment, you'll look at collisions between two gliders on an air track. You will measure the final momentum of an initially stationary glider, struck by another glider which is initially moving. You'll do this experiment for two different types of collisions, elastic and inelastic. Elastic collisions are ones where kinetic energy is conserved (the objects bounce off each other without losing any energy). Inelastic collisions (e.g., if the objects get stuck together) do not conserve kinetic energy. The kinetic energy of an object is defined as

$$K = \frac{1}{2}mv^2$$

where m is the object's mass and v is its velocity. Kinetic energy is not a vector: it's a scalar, and its units are Joules (J).

Conservation Of Linear Momentum Lab Report

Yan Bai



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