"New Experiments"

Outline

Goals

I. Upgrading and computerising the experiment "Free fall" in the 1st year labs.
II. Combining experiments "Standing waves and acoustic resonance", "Speed of sound in a pure gas" and "Speed of sound in a solid" in one new experiment "Sound waves in gases and solids" and creating a handout.
III. Testing a new setup for the experiment "Wilberforce pendulum" and creating a handout.
IV. Testing new gyroscope for lecture demonstration and the 1st year labs.

I. Free fall experiment upgrade

Experiment "Free Fall" in the 1st year lab is performed by measuring the time the falling objects falls between two photogates separated by a defined distance. Due to air resistance and drag force, the resultant acceleration is smaller than the free fall acceleration and strictly speaking the motion of the falling object cannot be considered a free fall. The formula for the relationship between the time of the fall and the distance traveled is not known because the instantaneous speed and acceleration are not measured. The free fall acceleration can be obtained more accurately if the motion sensor is used to record the instantaneous speed and acceleration of the falling object on its way down

The project can be divided into the following main stages:

1. Study of PASCO motion sensor and its use in the experiment with falling objects.
2. Designing the setup utilizing the motion sensor.
3. Assembling the model.
4. Testing the model. Writing a handout for a user.

II. Combining experiments studying the wave phenomena in gases and solids

This is a methodological project. The experiments are run with three slightly different devices. The future use of the setups is associated with combining three experiments in one. This procedure will result in creating of new experiment objective, updating some exercises and eliminating some other exercises.

The project can be divided into the following main stages:

1. Study of existing experiments and their results. Study of the 1st year PHY152 course curriculum in the part related to wave phenomenon.
2. Designing the combined experiment involving measurements of the speed of sound in gases and solids and study of standing waves.
3. Assembling a setup.
4. Testing the setup. Writing a handout for a user.

III and IV. Testing the new equipment for experiments with Wilberforce pendulum and gyroscope

For this part of the project, the experimenter is expected to make test measurements with the new equipment and write a handout for a user.