Khwarizmi Science Society
Developing a culture of science

KHWARIZMI SCIENCE SOCIETY

خوارزمی سائنس سوسائٹی
پاکستانی معاشرے میں فروغ سائنس کی علمی اور عملی تحریک

Thought-provoking practical physics workshop

فِکر انگیز عملی طبیعیات

Lesson: Inverse Square Law - Radiation

There are many phenomena that exhibit the Inverse Square Law. Some of the most well-known examples are the force of gravitation between two point masses, the intensity of light at a particular distance from a point source, and the electrostatic Coulomb force between two point charges. Mathematically, the inverse square law can be expressed as

_____.

Objectives

In this experiment, we will use a Light Dependent Resistor (LDR) to measure the intensity of a tungsten filament bulb to investigate the inverse square law.

How to conduct the experiment

Apparatus: Bulb, LDR, Digital Multimeter (DMM)

The resistance of an LDR is inversely proportional to the light intensity at its face. Due to this quantitative relation, an LDR can be used as sensor to measure the intensity of light. Use an Ohm-meter to measure the resistance of the LDR and translate the value to light intensity. A tungsten light bulb can be carefully approximated as a point light source. The position of the LDR will be varied and readings from the DMM will be noted to establish a relationship between light intensity and the distance of the sensor (LDR) from the source (bulb).

Exploration Points

1. Use two sources and determine the ratio of intensities and distances.
2. Are there any conditions under which the inverse square law is not followed?
3. What is the effect of changing the source intensity on the intensity-distance plots?
4. Investigate the effect of using other types of light sources.
5.
6.

Safety

Be cautious of the hot surfaces and the metallic contacts in-circuit with the 220V mains.