T6_124 LUCEGRAFO. A SIMPLE USB DATA ACQUISITION SYSTEM FOR DIFFRACTION EXPERIMENTS

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New technologies give us new opportunities for physics teaching/learning. Phenomena can be studied in real time with simple computer on-line equipments based on sensors. A USB system for diffraction measurements is constituted by a photodiode inserted in a housing made an alluminium block solid with the cursor of a linear potentiometer, so that the optic signal is correlated with the position by means of the resistance of the potentiometer. A small rectangular screen (12 cm x 2 cm), solid with to the optic sensor support, has the function of allowing overall qualitative observation of the distribution of light intensity. At the centre of the screen there is a slit (0,4 mm X 10 mm) functioning as a diaphragm for the optic sensor. A screw guide for fine movements of the cursor is available. Both the sensors (potentiometer and photodiode) are connected to an interface that provides the processing of the analog signal to be able to send to the computer in digital form. The calibration of the system is made measuring the light intensity as a function of the distance from a point-like source. There are 3 ranges of sensibility, to acquire the 12th maximum and the central maximum of a diffraction pattern obtained at a distance of 2 m, with a single slit of 0,12 mm and a laser with λ~650A.

The measure is represented in linear response: the intensity, in the graph, is represented in arbitrary units, proportional to the light intensity incident the sensor.

Educational activities proposed in previous contributions (Frisina A and Michelini M, Physical optics with on-line measurements of light intensity, in Teaching the Science of Condensed Matter and New Materials, GIREP-ICPE Book, Forum 1996, p.I62) are implemented with better results.