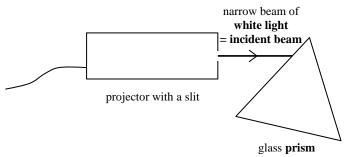
DNL - Physique 2^{nde} - L'Univers

LAB WORK 2 DISPERSION OF LIGHT

1. Dispersion of white light by a prism

Place a prism on a sheet of paper and a few cm in front of a projector. Rotate the prism slightly until a clear and wide spectrum is visible. Draw the outline of the prism on the sheet of paper as well as the incident beam of white light and the beam emerging from the prism (use colouring pencils).



- a. What is the name given to the band of colours observed?
- b. What colours do you see?
- c. Compare the directions, the widths and the colours of the incident beam and the beam emerging from the prism:
- d. What is white light made of?
- e. Draw on the paper the path of beam if it had not passed through the prism. Which colour is bent the most? the least?

2. Polychromatic or monochromatic light

A **MONOCHROMATIC** light is composed of a single wavelength. A **POLYCHROMATIC** light is composed of more than one wavelength.

Is white light a polychromatic or a monochromatic light? Why?

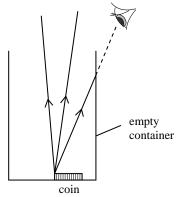
Experiments: - laser spectrum with a prism. What do you observe? What can you conclude?

- <u>cadmium</u>, <u>sodium or neon vapour lamp spectrum</u> with a spectroscope (see Lab Work *Spectroscopy*). What do you observe? What can you conclude?

3. <u>Why is white light dispersed by a prism?</u>

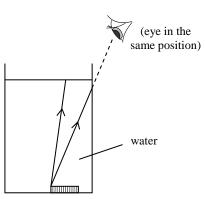
3.1. Travel of light How does light travel in a transparent homogeneous medium? **Experiment** 1 water laser sugar Observation: the ray of light Interpretation: 3.2. Change of medium **Experiment 2** Observation: laser incident ray Conclusion: plumb line water

Experiment 3 (Archimedes 287-212 BC)



Observation: the coin is not

Interpretation: the light rays reflected by the coin



Observation: As water is poured in the container, the coin becomes Interpretation: the light rays reflected by the coin undergo

3.3. Case of the prism

- a. Why is the emerging beam bent? (give the name of the phenomenon and explain why and where it occurs).
- b. The deviation of a ray of light depends on the refractive index n of the glass prism. According to the table below, is the refractive index of the glass prism the same for all wavelengths?

Colour	Wavelength λ	Refractive index
Blue	434 nm	$n_{glass} = 1.528$
Yellow	550 nm	$n_{glass} = 1.517$
Red	700 nm	$n_{glass} = 1.510$

c. Explain why white light is dispersed by a prism.

4. Conclusion

When white light is passed through a PRISM , it is split up into its component
The band of colours observed is called
and the spreading effect is called DISPERSION .
As white light entry the unions it undergoes on almost sharper of direction called
As white light enters the prism, it undergoes an abrupt change of direction called
White light is a mixture of an number of which the prism separates out because the deviation