**Experiments with polarisation**

**Introduction**

These practical activities allow you to observe effects of the polarisation of electromagnetic waves.

You may already be aware of the principles of polarisation, or your teacher may be using this activity to introduce the necessary theory.

**Aim**

* To observe polarising effects using light and microwaves

**Intended class time**

* 45 to 60 minutes

**Equipment (per group)**

Refraction using a semi-circular block

* ray box or similar light source
* three polarising filters ( can be lenses from 3D glasses or sunglasses)
* microwave emitter and receiver
* polarising grid for microwaves

**Health and safety**

* Note that lamp bulbs will be very hot

**Procedure**

1. Look through a polarising material and rotate it to observe any direct effects.
2. Look through two polarising filters and identify when they are in the same plane and mark this position.
3. What happens whilst either filter is rotated through 90º?
4. Investigate what happens with three filters.
5. Filter 1 and 3 in the same plane, rotate filter 2.
6. Filter 1 and 3 at 90ºto each other. Rotate filter 2.
7. Note your observations

**A) Polarisation of microwaves**

All electromagnetic waves may be polarised. This can be demonstrated using a simple microwave transmitter and receiver which use a wavelength of approximately 3cm. The transmitter emits a polarised wave, which is detected by the receiver and, depending on your centre’s equipment, may give a reading on an analogue meter, digital meter or a sound with varying intensity.

1. Try rotating the receiver slowly through 180º. Note your observations.
2. If your centre has a metal grid place this between transmitter and receiver. Rotate the grid and observe the maximum and minimum points of output. Can you make an assumption about the direction of polarisation of the waves and substantiate it based on your observations?

**Recording**

As evidence for the Practical Endorsement you should have evidence of your observations and measurements taken in a clear and logical format. All work should be clearly dated.

In addition, in preparation for the assessment of practical work in the written examinations and to help develop your understanding of physics, you should have drawn conclusions from the measurements taken and presented your information in a scientific way.