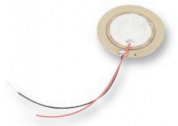


### III. Experimental part

**Objectives** : We aim at studying seismic waves by measuring their speed and studying if some parameters have an effect on them.

#### 1. Equipment

- ↪ A **parallelepiped** representing a piece of the Earth's crust.  
Different materials are available: **wood, limestone**.
- ↪ A **C.R.O.** (cathode-ray oscilloscope) and connection leads.
- ↪ Two **piezoelectric sensors**. They can turn a mechanic vibration into an electric voltage.  
Each electric voltage can be displayed on a CRO.  
Remark : They can be held on the parallelepipedic medium by a 100g mass.



The initial disturbance will happen by hitting sharply the material with a finger (in case of wood) or a metallic rod (in case of limestone).

#### 2. To become acquainted with the CRO

##### How to display a voltage continuously and carry out a measurement using cursors

We want to display an alternating voltage continuously.

- Connect the CH1 channel of the CRO to the alternating output (AC output) of the green supply (6V).
- Display 2 or 3 periods on the scope screen using buttons 4 (indicator B) and 5 (indicator C).
- Measure the signal period using cursors (see help card).

##### How to make the acquisition of a sample of a voltage

We want to display the establishment of a DC voltage (when the supply is switched on).

- Connect the CH1 channel of the CRO to the DC output of the ELC supply.
- Set the voltage to 6 V.
- Select the timebase: 10 ms/div or 25 ms/div.
- To start the acquisition, choose the moment and the level of triggering on the CRO (see help card).  
The acquisition starts when the voltage measured by the CRO becomes bigger than the value you choose for the acquisition level.
- Press the SINGLE SEQ button (on CRO 1002) to carry out an acquisition.
- Switch on the supply.
- Change the level and the moment of triggering. Then, carry out another acquisition.

#### 3. The work to do

- ↪ *Propose a method to achieve the objectives of the practical session.  
What are the physical quantities to be measured? How to perform each measurement?  
Call the teacher for checking*
- ↪ *Perform the experiment following the instructions and write down your conclusions.*

### How to measure the speed of a seismic wave

- Connect the sensor 1 to the CH1 and the sensor 2 to the CH2 of the CRO.
- Settings: 1 V/div and 500  $\mu$ s/div.
- Display CH1 and CH2 and separate the signals on the scope screen.
- Set the triggering level just above zero (Source: CH1).
- Press the RUN/STOP button (Select the Unique Mode for the sampling).
- Hit the material to get S waves.
- Determine their speed.
- Carry out the same experiment for P waves.
- Are your results coherent with the text?
- Suggest and carry out experiments to bring to the fore the parameters on which the speed depends. (see question II 7 and the results of the other groups)

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