



Experiment 14 X-Ray Device

Name:

Aim

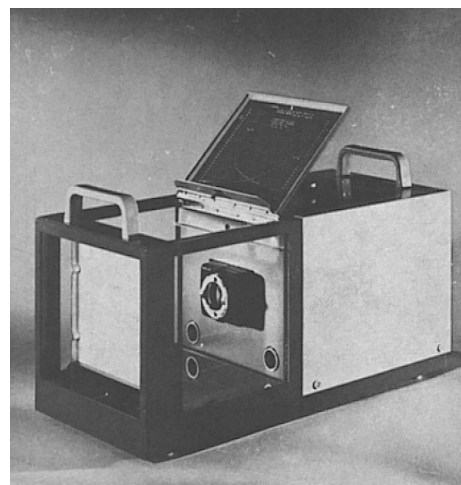
To observe some properties of X rays.

Set-up

The X-ray tube is contained in a case with a chamber of lead glass at the front. This glass absorbs almost all of the X rays emitted by the tube. Moreover, the X-ray device will be switched off when this chamber is opened.

It is possible to put objects inside the chamber. The absorption of X rays by these objects can be observed by looking at the colour intensity on the fluorescent screen.

Note: You activate the X-ray device by pushing the **red button** on top of the device. When you let go of this button, the device switches off. For each observation, do not activate the device longer than **5 s** in order to prevent overheating the X-ray tube.



Read the introduction on page 17 of the booklet *ISP Experiments* about the X-ray device.

Observations

1 Position the fluorescent screen in the chamber with its yellow side against the lead glass. Activate the device. Describe and explain your observations.

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2 Position the aluminium wedge between the X-ray tube and the fluorescent screen. Activate the device. Describe your observations. Draw a conclusion about the relationship between the thickness of the absorbing material and the absorption of X rays.

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3 Position the holder with three different metals between the X-ray tube and the fluorescent screen. Activate the device. Describe your observations. Draw a conclusion about the relationship between the density of the absorbing material and the absorption of X rays.

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4 Position the holder with three different liquids and paraffin between the X-ray tube and the fluorescent screen. Activate the device. Describe your observations.

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The holder contains the following three liquids: sodium chloride, lead nitrate and water. In the table below, record the names of the liquids in the correct order.

1	2	3	4
		Paraffin	

- 5** Position the integrated circuit (the small black block) between the X-ray tube and the fluorescent screen, first at a distance of about 1 cm from the tube and then at a distance of about 10 cm. In both cases, activate the device. Describe and explain your observations. In doing that, think about the shape of the X-ray beam: divergent, parallel or convergent?

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- 6** Remove the fluorescent screen from the chamber and replace it with the small screens of different fluorescent materials. Activate the device. Describe and explain your observations.

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- 7** Remove the fluorescent screens from the chamber and replace them with a charged electroscope. Position another charged electroscope in front of the device (outside the chamber). Activate the device. Describe and explain your observations.

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- 8** If wanted, wallets (without bank cards and the like, just to be sure), pencil cases and so on can also be irradiated. In that case, remove the electroscope from the chamber and replace it by the fluorescent screen.