# Crystals can play with light

They can absorb it, produce it, separate it...

and even change its colour.

**One calcite, two bottles...**

Calcite can separate light anisotropically. At some angles it can clearly separate the beam into two, thus creating two images changing with the orientation.

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## Absorbent crystals

Crystals can destroy light. If it absorbs light in the invisible range, the crystal is transparent. A black crystal absorbs all visible light. A coloured crystal absorbs only part of it. The absorption and colour depend on how the defects or impurities are ordered, and on the type of atoms in the crystal

## Fluorescent crystals

A fluorescent crystal has atoms in its structure capable of emitting visible light when exposed to different rays, such as ultra-violet light. The colour emitted depends on the atoms in the crystal and the energy – the wavelength – of the light received.

## Anisotropic crystals

When light crosses an anisotropic crystal its properties change, depending on the direction of the crystal. This is the case with quartz and calcite in particular.

## LASER crystals

Fluorescent crystals placed between two mirrors emit «**Light Amplified by Stimulated Emission of Radiation**» .The light from these «LASER» crystals is emitted in only one direction. It is much more intense than the light emitted by fluorescence.

## «Non linear» crystals

Some «non-linear» crystals can «change» the colour of a LASER beam; non-linear crystals are also anisotropic. The effect is exploited for application in diodes, colour screens, optical information storage and laser printing.

**Creating a LASER ...**

To create a LASER, light must first be directed onto a fluorescent crystal (to excite the fluorescence); the light must then be reflected back onto the crystal using one, two or more mirrors. The LASER beam obtained in this way is both fine and intense. Its colour depends on the nature of the atoms of the crystal and can be either visible or invisible. Some crystals can even «change» the colour of a LASER beam

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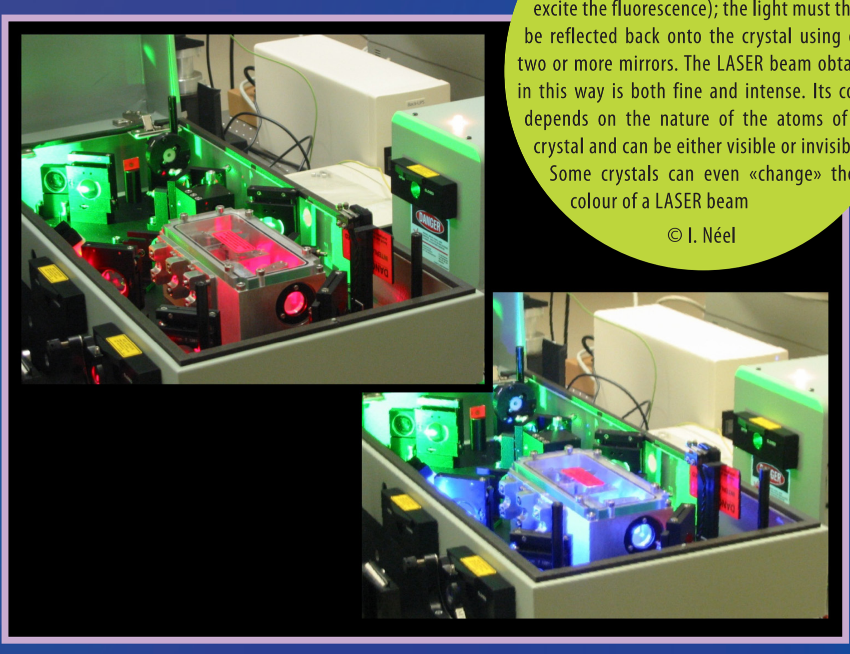

Some crystals contain atoms that emit light (fluorescent) when they absorb energy. This fluorescence is emitted in all directions in a colour that varies according to the energy received. By varying the wavelength of the UV received by the crystals in this black box we can change the colour of the light they emit.