

Re: questions about light

Source: <http://sci.tech-archive.net/Archive/sci.physics.research/2006-03/msg00215.html>

- *From:* Hontas Farmer <hfarmer@xxxxxxxxxxxxxxxx>
 - *Date:* Tue, 28 Mar 2006 08:04:53 +0000 (UTC)
-

laura wrote:

Dear all,

I do have some simple questions about light and its properties:

1. How a light ray can be divided into 2 or more sub-rays which have the same wave length? What devices are available for this?

What is your application? Optical (visible) light or general EM waves?

For optical wavelength's the following will work.

This can be done using a half silvered mirror as is used in a interferometer.

2. How can I change the wave-length of a given light ray? What is the greatest precision achieved for this operation?

The simplest example of this would be passing the light through a colored material. The color of light indicates it's wavelength. This could be done to practically any precision.

3. How do I measure the wave length of a light ray?

This is done using a spectrometer. First you have to build a spectrometer. This is not as hard as it sounds. In chemistry class I once had to make a spectrometer using a shoebox, two razor blades, a piece of diffraction grating and some finely ruled graph paper. I don't recall the exact procedure for assembly. Anyway after the device is constructed one needs to calibrate it using lights of various known wavelength's. Once that is

Re: questions about light

done you are in business.

4. How many rays having different wave-length can travel (in the same time) through an optical fiber cable?

Exactly what do you mean by rays? If your question is in principle how high is the limit to how many signals can be put on an optical fiber the answer is infinity. Waves of various wavelength's can be multiplexed on the same fiber without interfering with eachother. As long as nothing about the geometry of the fiber prevents the propagation of a wave of that frequency. (This get's into Maxwells equations and boundary conditions etc).

Thanks,
Laura

Hope this helps.