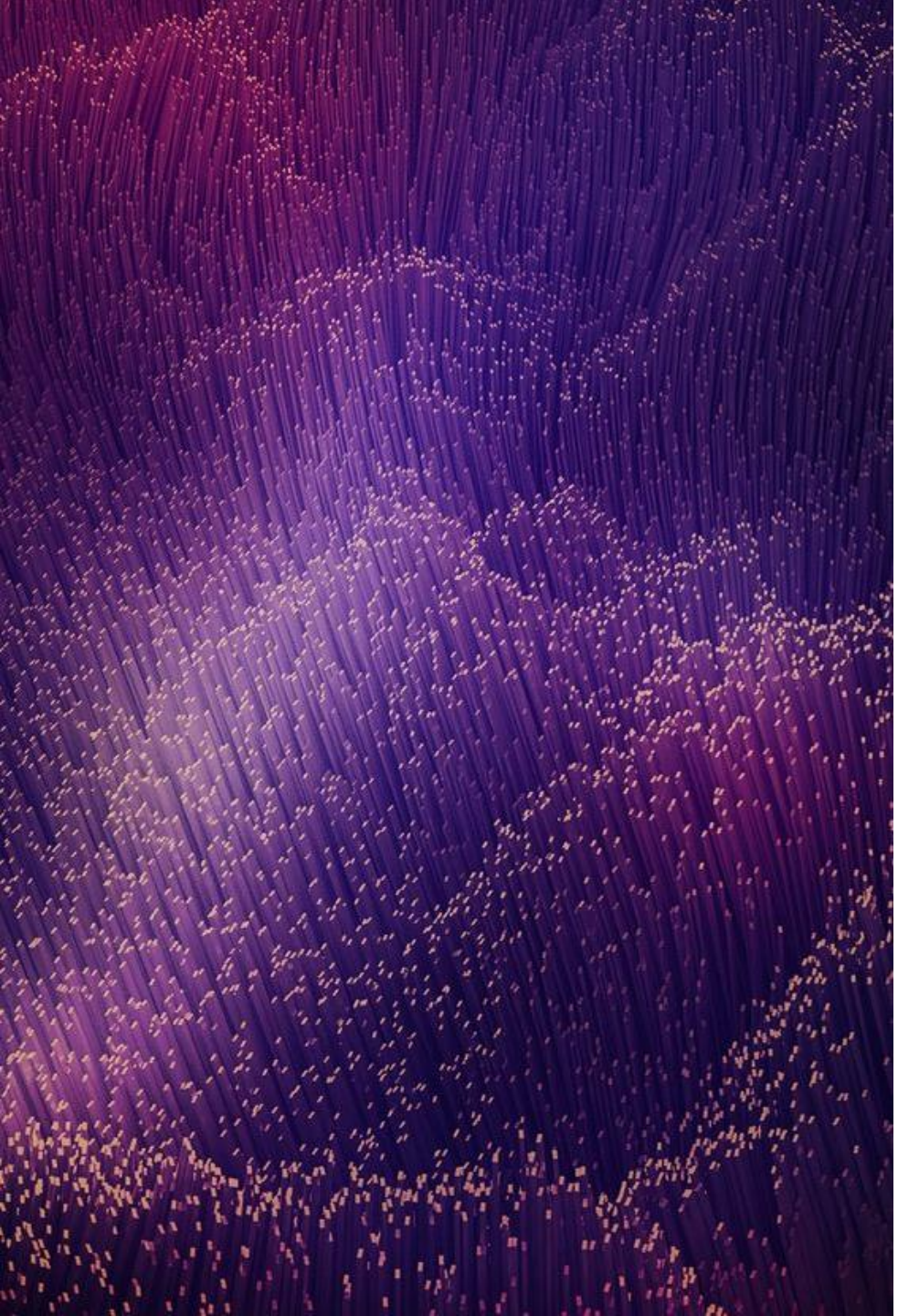


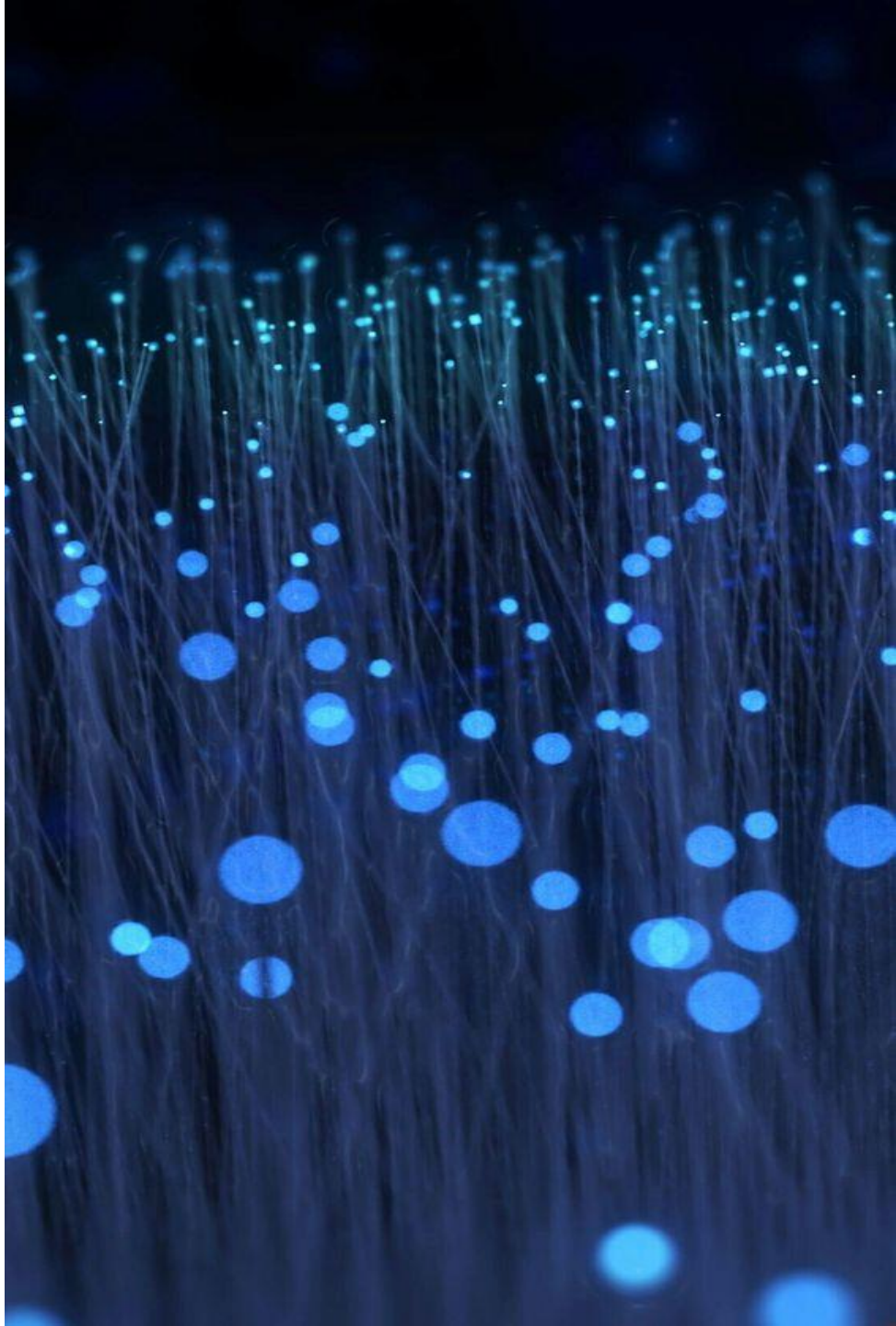
Fiber

Veins of today’s world

What is it?

Fiber- is a flexible, transparent fiber made by drawing glass or plastic to a diameter slightly thicker than that of a human hair. These cables are used to connect our world today, and are capable of transmitting information across countries and oceans like:

- Internet signal
- Telephone signal
- TV signal
- or even medical diagnostics (endoscope)



How does it work?

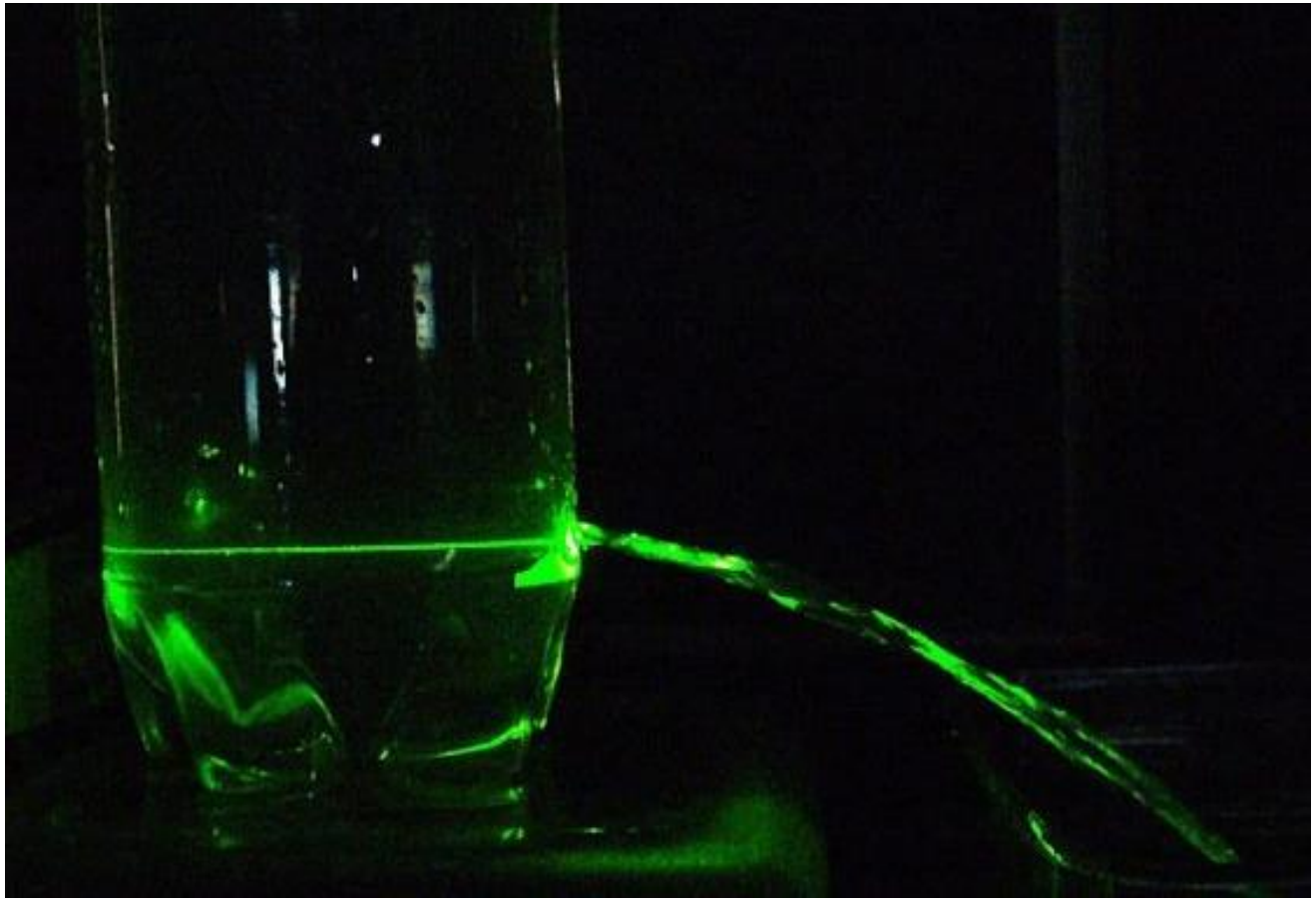
The easiest way to explain this process is to show the great experiment in which you will need

- 2 buckets
- Propylene glycol
- Laser pointer
- Hot glue
- Some type of glass or polycarbonate

Make one hole in one of the buckets about 6cm from the bottom and the second hole opposite. In the first hole make a little window, it can be made with polycarbonate and place it with hot glue. In the second one put flat washer (this thing under the screw). Place that bucket on the table and the other one on the ground. Pour propylene glycol into the one with holes and watch liquid run down to another bucket. Take a laser pointer and turn the light on through the window.

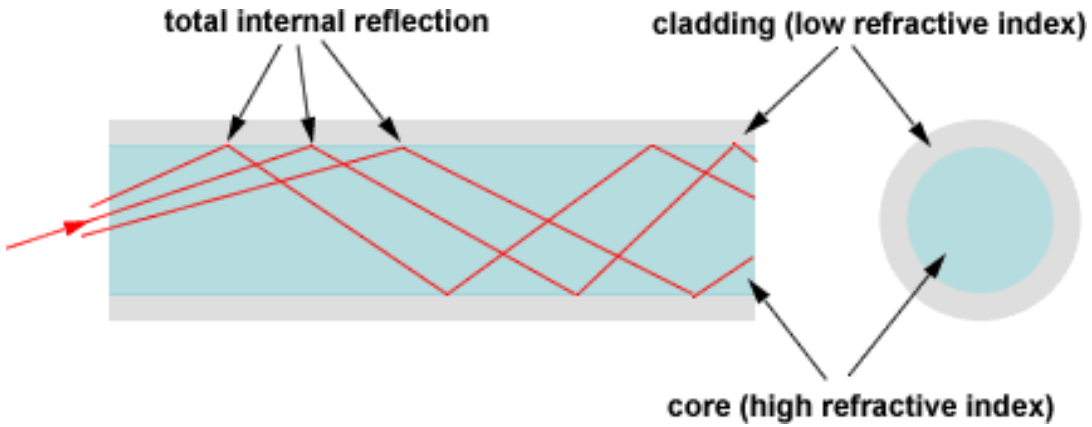
As you can see the light follows the liquid's flow all the way to the bucket. It does this because of total internal reflection.

As the light enters the stream it is reflected as soon as it hits the interface between air and liquid. You can see the first, the second and the third reflection. This occurs because there's a difference between index of refraction of the guide material here propylene glycol and the outside – air.



Total internal reflection

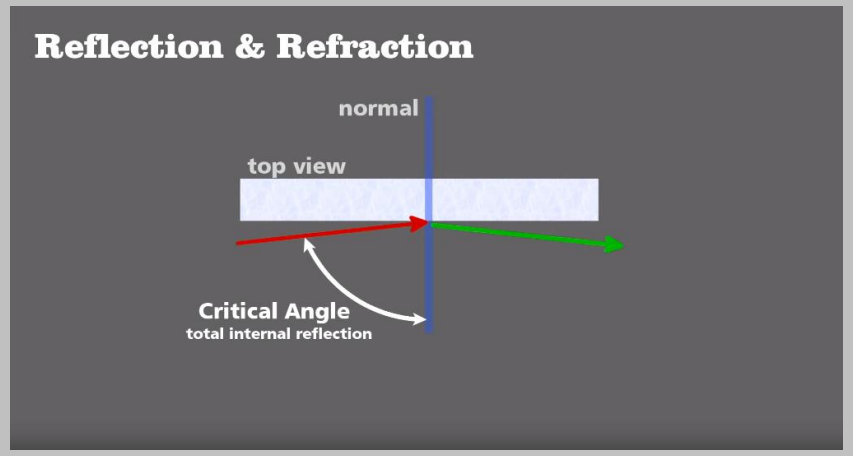
Total internal reflection, in physics, complete reflection of a ray of light within a medium such as water or glass from the surrounding surfaces back into the medium. The phenomenon occurs if the angle of incidence is greater than a certain limiting angle, called the critical angle. In general, total internal reflection takes place at the boundary between two transparent media when a ray of light in a medium of higher index of refraction approaches the other medium at an angle of incidence greater than the critical angle

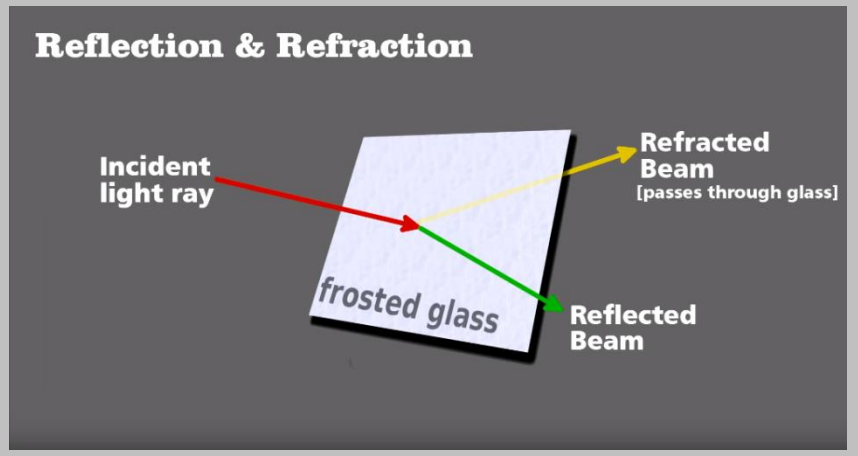


Reflection and Refraction

Recall that any time the light strikes a surface it can either be absorbed by the material, reflected from it or pass into or through it the latter we call refraction.

Reflection and refraction can happen at the same time but if the light hits the surface at an angle greater than the critical angle it will be completely reflected and not refracted.

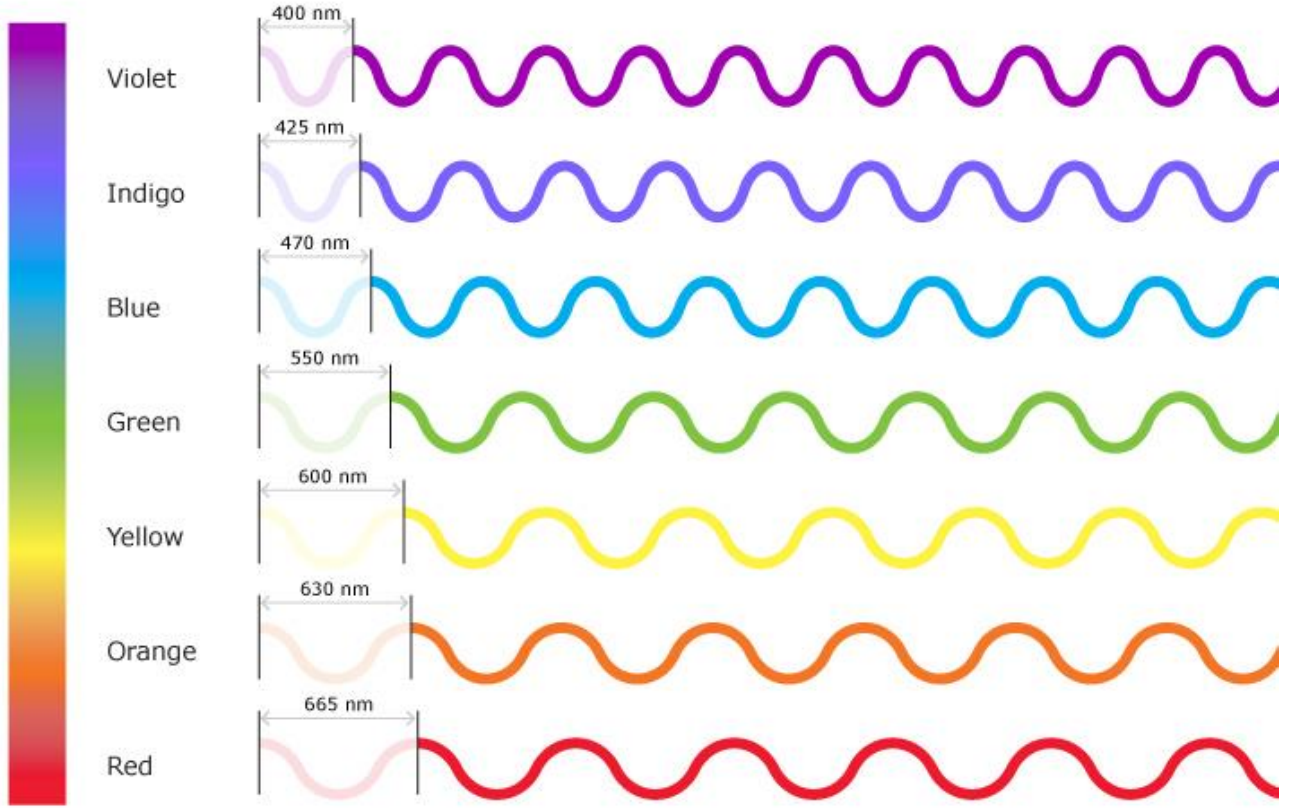




Light Waves

Light radiates from a source in waves. Each wave has two parts; an electric part, and a magnetic part. That's why light is called Electromagnetic Radiation.

Our brains interpret light waves by assigning different colors to the different wavelengths, but much of the light in the Universe travels with wavelengths too short or too long for the human eye to detect. The longest wavelengths are the infrared, microwave, and radio portions of the spectrum. The shortest wavelengths of the spectrum are the ultraviolet, x-ray, and gamma radiation. The visible portion is a very small part of the electromagnetic spectrum.



Laser Light

Lasers work to amplify a light source and turn it into one powerful, concentrated beam. Electricity must be supplied to the laser through a power supply. Lasers can be powered through the use of batteries, electricity, or even another laser. Lasers also must have a medium that produces amplification of light. Once a laser has power and something to pass through, it becomes a concentrated beam. This beam can then be emitted outward in a single line of bright light. The word "laser" is an acronym that stands for "light amplification by the stimulated emission of radiation."