How Does a Laser Work?

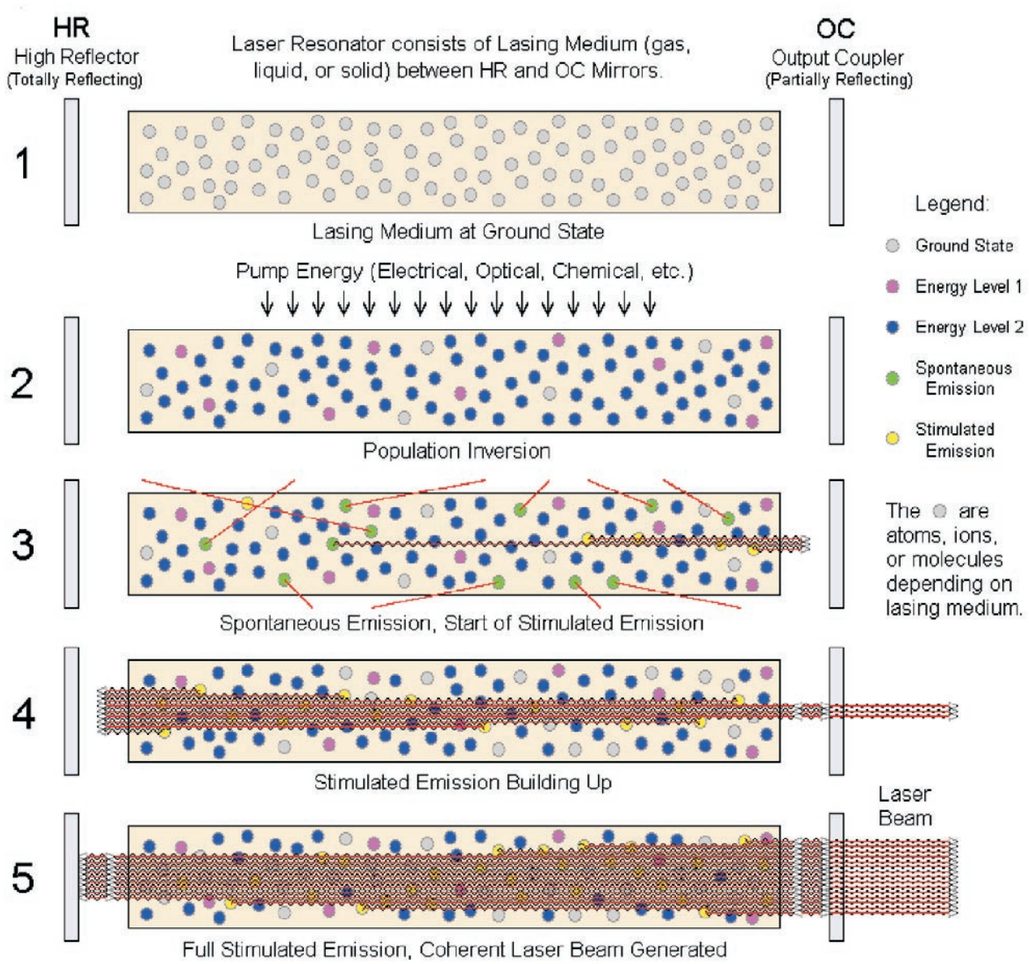
Light Amplification by Stimulated Emission of Radiation

Between 1910 and 1920, scientists including Albert Einstein theorised that atoms could be made to give out radiation under certain conditions. The technology to test this theory, however, only became available in the 1950's. By 1965, Theodore Maiman had put the theory to practical application by using a ruby rod surrounded by a flash tube and helium-neon gas, to generate radiation which came to be known as laser beam.

The name LASER is an acronym which describes the way a laser works – Light Amplification by Stimulated Emission of Radiation.

A laser is a device, which excites atoms, the smallest particles of the Universe, so that they give out energy as light in a unique way. Follow the diagram to the right for an illustration of how this occurs, using Theodore Maiman's rod made of ruby crystals as an example. This rod is set inside a cylinder with a mirror at either end. One mirror is fully reflective, but the other is only partially silvered and so a very strong light will be able to pass through it. A flash tube is coiled around the cylinder. When this fires a flash of light the ruby atoms become excited and produce tiny bursts of light called photons. These photons strike the atoms, exciting them to produce more and more photons until the tube is filled with them bouncing back and forth from mirror to mirror. Soon the amount of photons is so great that they pass right through the partially reflective mirror. This is the laser beam itself. Laser beams can be generated by several other means, though the most common in construction lasers are laser diodes. MCE Lasers uses both red and green beam laser diodes in their products. While red beam lasers are the most common and less expensive, green beam lasers provide superior visibility.

When the laser was invented, it was thought to be merely an interesting scientific oddity with no practical use. Since then, important uses have been found for lasers, and their usefulness in many aspects of modern life continues to grow. These include industrial cutting and welding, medical treatment, communications, pollution monitoring and nuclear fusion research. Lasers also provide the most superior alignment and leveling solutions in modern industry applications.



Ordinary light *Laser light*