



LASER CAN PUT THE EYES OF AN AIRCRAFT PILOT IN JEOPARDY

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WHO is not seized of the wondrous powers of the laser! It has applications in a wide range of fields such as communications, industry, medical science, defence and space science. Thanks to technological advancements, it has become possible to develop both continuous and pulsed lasers. In a continuous laser, laser light is emitted continuously, whereas in a pulsed laser, it is emitted intermittently in a pulsed manner.

It is possible to get a pulsed laser using some special techniques such as Q-switching, 'mode locking', etc. Pulsed laser using Q-switching has a duration, which is of the nanosecond order (10^{-9} seconds), while the pulsed laser obtained through mode locking has a duration of the order of picoseconds (10^{-12} seconds). Scientists have succeeded in obtaining laser pulses with durations as short as femtoseconds (10^{-15} seconds) using a special technique called Chirped Pulse Amplification (CPA). The laser obtained through this process has a power of several terawatts (10^{12} Watts) magnitude. Pulsed lasers have specialised applications in many areas of research importance.

Picosecond and femtosecond laser pulses have numerous applications in chemistry. A special branch of chemistry, called femtochemistry, has myriad applications of femtosecond laser pulses. The scientists have also succeeded in developing attosecond laser pulses with a pulse duration of 10^{-18} seconds. This has given rise to a new branch of physics, known as attosecond physics. The attosecond pulses enable the direct observation and study of the rapid movement of electrons within matter. Attosecond physics has important applications in the semiconductor industry, chemistry, biology, to even astronomy. Attosecond physics has significant applications even in the field of high-resolution imaging and spectroscopy. For the development of attosecond laser pulses, three physicists, Pierre Agostini, Ferenc Krausz and Anne L'Huillier were awarded the Physics Nobel for the year 2023.

Despite numerous applications in various fields, lasers need to be used with care and caution, as they can cause significant damage to the human skin and eyes if not handled properly. When working with laser light, it is essential to be cautious and avoid looking directly at the laser beam.