

[3] What are the advantages of ultrafast lasers?

- Ultrafast lasers concentrate all the pulse energy within a very short time, and therefore can provide extremely high peak power.
- The properties of ultrafast lasers are very useful and important in many applications that were not possible with standard lasers, such as micromachining to make very tiny holes without generating heat.

[4] Explain the history of innovation in pulsed laser technology.

- The first ultra-short pulsed laser, which used a technique called “mode-locking,” was invented in 1965. The first practical pulsed laser was the Titanium-Sapphire laser, invented in 1982. This laser was very expensive and very large. In 1986, the first optical fiber amplifier and laser were invented, which was an important innovation that made lasers much smaller, more reliable and more practical. This technology powered the Internet. The first carbon nanotube ultrafast fiber laser was invented in 2003, enabling a very compact laser that could be held in the palm of your hand. Research in a lab at the University of Tokyo contributed to this invention.

[5] Explain how optical fiber is used in our daily life.

- Optical fiber is the backbone of our Internet society right now. It supports all Internet communications, mobile phone networks, data centers, banking, trading, and most recently online-meetings and education, among other things.

