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Emerging Applications of the LASER Technology

Aaron:

Hi, I'm Aaron

Srisht:

and I'm Srisht

Aaron:

and we welcome you to our oral presentation on

Srisht:

emerging applications of the LASER technology.

Aaron:

Laser technology is a staple of science fiction and our daily lives. This 60-year-old technology continues to improve, and engineers are still developing brand new applications for lasers. [4] An acronym for 'light amplification by stimulated emission of radiation,' the first laser was built in 1960 by Theodore H. Maiman at Hughes Research Laboratories, based on theoretical work by Charles Hard Townes and Arthur Leonard Schawlow. [2]

Srisht:

There can be no question that the laser has driven scientific and technological innovation into virtually every facet of modern life. From surgery to communications, from medical diagnostics to printing, from metal-cutting to retail management, the laser has proven an essential and transformational tool.

But will the laser continue to drive similar advances in the future? Or will it level off into a useful, but increasingly mundane technology? [5]

Aaron:

The laser shows every sign of continuing its uniquely creative role. [5] Back in 1961, they were used for medical treatment in optical surgery. [4] Today, they are used for various medical procedures such as dermatology and cosmetic surgery, wound healings, nerve stimulation, dentistry, and many other therapeutic procedures. Diode lasers have been also used for cancer therapy, bio-sensing, bio-imaging, drug delivery, and diagnostics of cancer cells. [8]

Srisht:

With proper use, lasers allow the surgeons to accomplish complex tasks, decrease postoperative discomfort, reduce the chance of wound infection, and achieve better wound healing. However, as with any type of surgery, laser surgery has potential risks. Risks of laser surgery include incomplete treatment of the problem, pain, scarring, and skin color changes. On the bright side, laser surgery uses non-ionizing radiation, so it does not have the same long-term risks as x-rays or other types of ionizing radiation. [9]

Aaron:

Laser light is an absolute innovation in automotive lighting and the next big step forward since the introduction of halogen, xenon, and LED headlight technologies. This lighting trend opens up completely new horizons in the design and performance of headlights. In the future, headlights can be designed to be much smaller and more efficient with laser light. [10]

Srisht:

Laser diodes are particularly impressive due to their small size: One laser diode generates an almost punctiform luminous flux on a few thousandths of a millimeter. The brightness is already today almost four times that of an LED. This means that headlights can be made even smaller in the future – without compromising on light intensity. [10]

Aaron:

The primary benefit for drivers is that these headlights will have the longest range provided by any current headlight technology. This offers the driver improved visibility, resulting in increased road traffic safety. As a result of this laser technology, the full beam of these vehicles has a range of up to 600 meters, double the distance covered by the standard LED headlights that are commonly sold today. [10]

Srisht:

There are many more applications in which laser technology holds huge promise. Emerging semiconductor laser technologies are revolutionizing the industrial material processing and optical sensing markets. Moreover, the automotive and electronics industries are benefiting greatly from advances in laser manufacturing, 3D sensing and imaging, lidar, and industrial machine vision. [3] The list goes on, but today in 2021, celebrating the 61st anniversary of the first working laser... can there be any doubt that the laser and its applications will continue to proliferate? [5]

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