Changing narrative

Advances in fiber lasers enable the technology to expand into new markets, says **Brian Victor**, director of global applications, **nLIGHT Inc**.


BRIAN VICTOR

Q. What is driving the continued growth rate in the adoption of fiber lasers?

Brian Victor: When fiber lasers emerged on the industrial market, they had to compete with the incumbents: CO_2 and YAG lasers. The original key selling features of fiber lasers were that meticulous maintenance, precision alignment or expensive consumables were no longer required. However, fiber lasers' cutting speed quickly became the primary advantage, and the narrative moved away from low operating cost to the significantly faster speeds over CO_2. On thin sheet, a fiber laser can cut three times faster than a CO_2 laser with equivalent power. This dramatic increase in productivity set fiber lasers on a rapid growth curve to quickly take market share in the industrial cutting market in the subsequent seven to eight years. As the market for fiber lasers advanced, so did the technology inside the machine. Improvements to the pump diodes within a fiber laser have enabled a lower price per watt of laser power while also increasing performance.

Q. Please provide examples of the new markets fiber lasers are addressing.

Victor: Before fiber lasers, cutting and welding reflective metals, such as copper, brass, aluminum, silver and gold, were never considered to be viable laser applications due to the fears of damaging a CO_2 or YAG laser with its own laser light reflected off the metal surface. Damage from back-reflected laser light is not a concern with fiber lasers. You can cut thin copper for architectural accents and thick copper for electrical bus connections, or weld aluminum for automotive bodies and airframe structures.

Electric vehicle battery production is another market where fiber lasers are a key enabling technology. Traditionally, the electrode foils in the battery cell would be sheared, slit or die-cut but mechanical cutting tools wear out and are not flexible for changeover of part designs. Fiber lasers can be quickly reprogrammed to cut a different part shape. Additionally, laser cutting is non-contact so there is no blade or die set to replace monthly.

Another new market enabled by fiber lasers is additive manufacturing. The most significant growth areas in additive manufacturing focus on better printed material properties and finer feature resolution of printed parts. These can be accomplished with the capabilities of higher-performance fiber lasers.

Q. How will fiber lasers develop and advance during the next decade?

Victor: Applications in cutting and additive manufacturing will likely continue to grow. AM is still in early development but has proved its worth beyond the hobbyist. Fiber laser cutting has become more economical with higher productivity and reduced costs. As long as this trend continues, fiber laser cutting is poised to capture more applications from non-laser cutting technologies such as plasma, waterjet, shearing and blanking.

When fiber lasers first emerged in the cutting market, the most popular power node was 1-2 kW. The industry has shifted demand to higher powers of 3-6kW for faster speeds. This power trend could continue to 10 kW and beyond.

Remote laser processing will become a more significant growth area for fiber lasers in the near future. Remote processing uses a scanner to move the laser beam on the part from a remote distance. By scanning the beam rather than moving a conventional cutting or welding head, you can achieve significantly higher speeds, particularly in the skip times—jumping between different regions of the part when the beam is off. Remote welding is now limited to high-volume applications like automotive doors, seats and bodies. However, with higher-performance fiber lasers around 1-4 kW and remote scanners with mid-range capabilities available at lower costs, new laser welding markets should open, such as the lighting industry or white goods market.

All these growth opportunities rely on continued improvement in fiber laser price and performance. Whether for welding, cutting or other material processing applications, the productivity and versatility of fiber lasers will continue to play an important role in fabricating and manufacturing. **FFJ**

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