Laser Focus World

Tunable 2 µm disk laser achieves 5 W

Mid-infrared lasers for applications in pollution monitoring, remote sensing and ranging, free-space optical communications, and medical diagnosis require a high-brightness, compact laser source. While edge-emitting diode lasers can span the short-wave, mid-infrared range (2 to 3 µm), researchers at the Institute of Photonics at the University of Strathclyde (Glasgow, Scotland) and the Fraunhofer Institute for Applied Solid-State Physics IAF (Freiburg, Germany) in a European-Union funded collaboration called Project VERTIGO (www.2micron-laser.eu) have developed a 2 µm optically pumped semiconductor disk laser (OPSDL) with record output powers and optimal beam quality.

The approximately 10-µm-thick, antimonide-based OPSDL structure consisting of a multiple quantum well active region grown on a distributed Bragg reflector was pumped by a 25 W, 980 nm diode laser. Crucial to achieving high output power was a 250-µm-thick natural diamond heat spreader bonded to the active region. Optimization of the pump optics resulted in an output power of just over 5 W at 2.0 mm—and tunable over a range of 80 nm with an average power greater than 1 W—with a high beam quality factor (M2 values as low as 1.06). Contact John-Mark Hopkins at johnmark.hopkins@strath.ac.uk.