Semiconductor disk lasers: a solid state dye laser technology?

By
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Host: Asst. Prof. Sun Handong

Abstract
Over the past few years an entirely new category of semiconductor laser has emerged to prominence: that of the semiconductor disk laser (SDL), also known as the vertical external cavity surface emitting laser (VECSEL). This hybrid technology adopts cavity design and operational principles from traditional doped-dielectric diode-pumped solid state lasers and applies them to semiconductor platelet gain media: SDLs thus combine the wavelength versatility and broad tuning associated with semiconductor band-gap engineering with the high-brightness and high intra-cavity fields typical of solid state lasers, to give ‘dye-like’ solid state lasers. The result has been a transformative technology operating from the UV to the mid infrared, offering, amongst other benefits, high powers of up to 10’s of Watts CW, low noise, tunable single frequency operation and controllable sources of GHz ultrashort pulses. Our group at the University of Strathclyde has been one of the pioneers of this exciting area and we will overview the relevant background of the technology and recent developments including using these lasers to intracavity-pump diamond (Raman) lasers.

Biography
Professor Martin Dawson Prof. Martin Dawson is one of the founders of the Institute of Photonics (http:// photonics.ac.uk) at the University of Strathclyde in Glasgow, UK, where he is the Director of Research. He has 30 years’ research experience in photonics, covering a wide range of areas including diode-pumped and ultrafast lasers, nonlinear optics, semiconductor optoelectronics, and advanced microfabrication in hard and soft optical materials. He is widely recognised for pioneering contributions to III-V semiconductors, semiconductor disk lasers, and gallium nitride microsystems research. Prof. Dawson holds fellowships of the IEEE, OSA, the Institute of Physics (UK), and Scotland’s national academy The Royal Society of Edinburgh.