Cooling crystals aid ultrafast laser project

AN initiative funded by the EU, which aims to further develop an ultrafast pulsed disk laser that will have the highest speeds and output powers ever achieved, has chosen Element Six to assist the design using its cooling crystals. The laser will improve the micromachining processes used to produce transparent materials, such as the glass for smart phones.

The project titled 'Ultrafast high-average power Ti:sapphire thin-disk oscillators and amplifiers' will attempt to build, as the name suggests, two high-average power ultrafast Ti:sapphire (TiSa) thin-disk laser systems; one amplifier system using chirped pulses to obtain high-energy pulses, and one high-power oscillator to achieve high repetition rates. Both will have a maximum average output power of at least 200W at a pulse duration of below 100fs.

'TiSa will be used as the laser crystal material'

To achieve these goals, TiSa will be used as the laser crystal material, which provides a broad bandwidth of emission and is ideal for ultrashort pulse laser systems, yet lacks good thermal properties.

The European Commission's Seventh Framework Programme for Research and Technological Development, which is behind the three-year project, has appointed Element Six to assist with the thermal problems with TiSa. Element Six will further develop its low-loss, high purity single crystal chemical vapour deposition (CVD) diamond material to conduct heat off the TiSa thin-disk. Element Six hope this will improve the thermo-optical effects of the medium and allow it to be pumped at the required higher powers.

While Element Six's CVD diamond already has a thermal conductivity of up to 2,200W/mK as well as low birefringence and absorption rate, for this laser system application to be successful, further reductions in absorption coefficient of the CVD diamond and an increase in available area will be needed. 'To date, our CVD diamond material has been leveraged for a range of commercial solid-state laser systems with great success demonstrating unparalleled levels of heat extraction – enabling laser systems to operate at higher powers with improved beam quality,' said Adrian Wilson, director of the technologies group at Element Six. 'For TiSa thin-disk, we have been called upon to further improve our existing crystal CVD diamond, extracting additional value – and we are determined to meet expectations.'

Efforts on TiSa thin-disk began in December 2013, and the project was recently granted €3.1 million by the European Commission's Seventh Framework Programme for Research and Technological Development. Other partners collaborating on TiSa thin-disk include the University of Stuttgart, the Centre National de la Recherche Scientifique, Thales Optronique,

IN BRIEF

Edmund Optics has announced the winners of its 2014 Educational Award. Prizes were awarded to work in medicine, life sciences and quantum computing. To find out more about the winners, see www.edmundoptics.eu/award.

Acal BFi has signed a pan-European distribution agreement with Altechna for its range of laser optical components.

Laser Components USA is now a distributor for Lumics' high-power laser diode products in USA, Canada, and Mexico.

Onefive has signed an agreement with Leica Microsystems for a pulsed STED depletion laser at 775nm, which will allow Leica's STED super-resolution microscope to achieve sub-30nm resolution.

Web-exclusive analysis and opinion now online

Carlos Lee at EPIC reports from a working dinner at ECOC on standardisation in photonic integrated circuits

www.electrooptics.com/news

One million aspheres to be supplied to Chinese laser company

LightPath Technologies has signed a contract to supply one million moulded aspheric lenses to a Chinese specialist in laser surveying equipment, Changzhou Huada Kejie Opto-Electro Instrument (HDOEI), by 2015. The lenses will be integrated into surveying products for the home improvement market, a new market sector for HDOEI, representing the increasing range of applications that optical components are used in.

The lenses will be produced in the LightPath Technologies' recently opened high-volume production facility in Zhenjiang, China.

HDOEI, located in Changzhou, Jiangsu Province, China, manufactures laser surveying instruments and accessories for Fortune 500 construction engineering companies worldwide. The lenses chosen for this latest contract is part of its laser tool lens line. 'With cooperation from LightPath, HDOEI will begin the development of the modern smart home market in China and Asia,' said Ou Zhang, general manager and CEO of HDOEI.

'We are very pleased to strengthen our partnership with HDOEI... as they continue to expand their market presence and enter the home improvement market in China and other countries in Asia,' added Jim Gaynor, CEO of LightPath Technologies. 'We are benefiting from a substantial increase in revenue generating opportunities and broader market applications as a result of our investments in technologies that decreased our lens production costs and expanded our production capacity.'