Bühler Technologies GmbH / Harkortstraße 29 / 40880 Ratingen / Germany

Characterising single photon detectors with tuneable ultrafast IR lasers

Ultrafast infra-red lasers
Chromacity Ltd reports how its tuneable **ultrafast infra-red lasers** are helping researchers characterise **single photon detectors (SPDs),** essential devices for applications including quantum key distribution, LIDAR, as well as sensing and characterisation of samples using fluorescence lifetime measurement.

Image caption: Auskerry and Haskeir Tuneable IR Laser Sources (courtesy: Chromacity Ltd).

As infrared light
is less susceptible to atmospheric absorption – researchers are pushing to develop single photon detectors that operate in the near and mid infrared. Emerging technologies such as Superconducting Nanowire Single-Photon Detectors (SNSPDs) have a very high photon detection efficiency and very low timing jitter, making them suitable for many single-photon applications.

However, testing
and validating the characteristics of these new sensors can be challenging – until now. As this new generation of single photon sensors are sensitive over a wide wavelength range, a source capable of scanning the complete wavelength range is important to create a complete picture of performance. The time domain performance is also affected by the wavelength of the incident light, so being able to probe the sensor with a low jitter photon pulse is essential.

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Chromacity
has developed a family of tuneable ultrafast infrared lasers that are ideal tools for SPD testing. The Auskerry laser is capable of continuous tuning across the 1.4µm to 4.2µm, and the Haskeir laser from 4.5µm to 12µm. Both lasers can generate 2ps pulses at either 100MHz or 200MHz repetition rates with very low jitter.

The Auskerry laser
uses a periodically poled lithium niobate (PPLN) non-linear crystal to generate near infra-red light in the range of 1.4um to 4.5um. The Haskeir laser uses a different Orientation Patterned Gallium Phosphide (OP-GaP) non-linear crystal to generate mid infra-red light in the 4.5um to 12um range. Both lasers have been optimised to generate 2ps pulses with very high temporal fidelity allowing researchers to investigate the time domain behaviour of detectors with high confidence.

For more information
about our tuneable ultrafast IR lasers for characterisation of SPDs please visit https://chromacitylasers.com/ultrafast-lasers/chromacity-opo/ or contact Chromacity Ltd. on +44-131-449-4308 / sales@chromacitylasers.com.

Chromacity Ltd.
is a world leader in the design, development, and manufacturing of advanced ultrafast pulsed fibre lasers. Based in Edinburgh, UK, the company specialises in fixed wavelength femtosecond and picosecond optical parametric oscillator (OPO) based tuneable laser systems. Based on a novel patented laser architecture that delivers ultra stable long-term performance, the fixed wavelength femtosecond fibre lasers work at 1040nm and 920nm, and the tuneable picosecond OPO lasers work across the near infra-red and mid infra-red wavelengths from 1.4um to 12um. Lasers from Chromacity Ltd. are simple to use, with no specialist support required to operate them – you turn them on, configure and use. These compact, air-cooled devices offer unrivalled long term pulse stability without the need for on-going maintenance.

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