

Company & Product Portfolio Overview

February 2022

Background



Company Key Facts

- Established in 2013
- Headquartered in Edinburgh, Scotland
- Key Markets : Asia, Europe and Northern America
- 12 Staff
- 3 Patents
- ISO 9001:2015 (Quality Management Systems)
- CE Mark Systems (Europe)
- FDA approval (US)

Core Applications

We design and manufacture ultrafast lasers that span the spectrum from visible to mid-IR.

Our range of ultrashort-pulse lasers serve as a reliable light source for scientific and industrial applications. Chromacity are focused on:



Key applications include: life science imaging, environmental monitoring, semiconductor fault analysis and fundamental research in non-linear and quantum optics. We aim to develop industrial strategic partnerships to deliver next generation photonic-based solutions.

Product Offering



Current Products



520 nm

Output Power:
Up to 2.25 W
Pulse Duration:
< 150 fs
Repetition Frequency:
100 MHz
Beam Parameters:
Ellipticity > 0.95

1040 nm

Output Power:
Up to 4 W
Pulse Duration:
< 150 fs
Repetition Frequency:
100 MHz
Beam Parameters:
M2 < 1.2, Divergence < 2 mrad

Auskerly OPO

Spectral Range:
1.4 μm – 4.2 μm
Signal Average Power:
850 mW at 1.5 μm
Idler Average Power:
up to 350 mW at 3.3 μm
Repetition Frequency:
100 MHz

Haskeir OPO

Spectral Range:
4.5 μm – 12 μm
Output Power:
Up to 100 mW at 5-7 μm
Up to 20 mW at 12 μm
Repetition Frequency:
100 MHz

Features & Benefits

Low Cost

Affordable ultrafast lasers without compromise to performance.



Cost
Competitive

Usability

An **intuitive** web browser interface ensures ease-of-use.



Plug & Play
Functionality

Installation

Minimal set-up required and systems are **installed remotely**, without the need for an engineer onsite.



Remote Installation
Capability



Compact System

Size

Compact laser housing occupies a small space on the optical bench.



High Average
Powers

Operational Efficiency

Power efficient laser cavity (low power consumption).



Air Cooling

Environmental Impact

Air-cooled systems avoid the use of water and additional infrastructure.

Market Applications



Chromacity
520



Chromacity
1040



OPO
Auskerry OPO
Haskeir

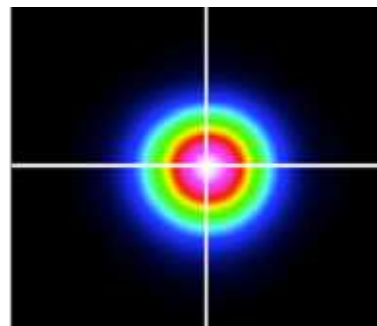
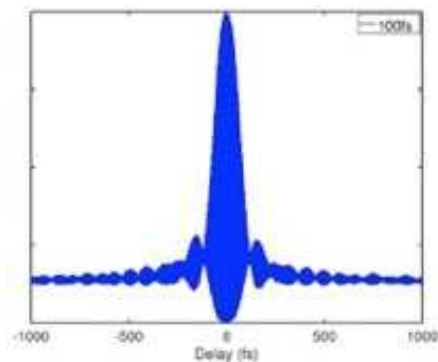
Microscopy	Life Science Imaging - 2 Photons + SHG			
	Life Science Imaging - Lightsheet /SPIM			
Spectroscopy	FTIR (Stand-off detection / Process Control)			
	Time-resolved Fluorescence Lifetime Spectroscopy			
	Vibrational Spectroscopy			
	Fundamental Research - Spectroscopy			
Test and Measurement	Semiconductor Fault Analysis			
	LIDAR			
Material Characterisation	Material Deformation - Sintering			
	Material Deformation - Nano Particles			
	Photopolymerisation			
Agritech	SHG Imaging (Collagen and Starch)			
	Nonlinear Optics			
Fundamental Research - Photonics	Quantum Optics - Communications			
	Quantum Optics - Entanglement			

Chromacity 1040



Chromacity 1040

Ytterbium fiber-based ultrafast laser delivering 4 W output at 1040 nm with 100 MHz repetition frequency.



$M^2 = 1.07$, Ellipticity >0.9
Divergence < 2 mrad



Average Power	Wavelength	Repetition Frequency	Pulse Duration	Beam Parameters
4 W	1040 nm	100 MHz	< 150 fs	$M^2 < 1.2$ with Ellipticity >0.95
500 mW	1040 nm	100 MHz	< 150 fs	$M^2 < 1.2$ with Ellipticity >0.95

1040 Technical Benefits

Ideal Wavelength

Longer wavelength than Ti:Sapphire lasers allows greater depth penetration of samples, and detection of multiple fluorescent markers.

Ideal for various SHG imaging techniques.

High Average Power

High power system adds flexibility to run several experiments whilst maintaining a good signal to noise ratio.

Reduces requirement for high end detection systems.

Long-term Stability

Chromacity 1040 has been custom designed onto a temperature-controlled baseplate ensuring a reliable and stable output.

Ultrashort Pulse

Combined with high average power and good beam quality ensures the highest intensities can be reached.

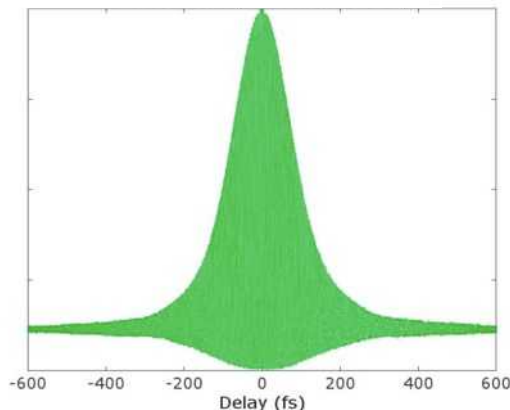
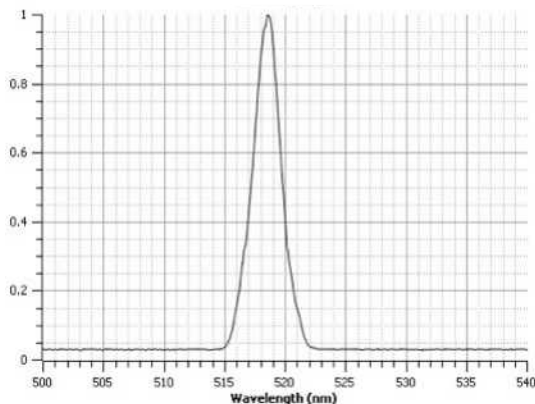
Key for driving non-linear effects such as 3-dimensional multiphoton imaging.

Chromacity 520



Chromaticity 520

The Chromacity 520 delivers sub-150 fs pulses with 100 MHz repetition rate.



Beam Output	Average Power	Wavelength	Repetition Frequency	Pulse Duration	Beam Parameters
Free space	up to 2.25 W	520 nm	100 MHz	<110 fs	$M^2 < 1.2$, Ellipticity >0.9
Fiber delivery	Up to 1.8 W	520 nm	100 MHz	<110 fs	$M^2 < 1.2$, Ellipticity >0.9

Optical Parametric Oscillators



We've been inspired to name our optical parametric oscillators (OPOs) after Scottish lighthouses.

Lighthouses are one of the earliest forms of harnessing light for commercialisation, protection and for making discoveries.

Light from our OPO empowers researchers to push the boundaries of scientific research to develop photonics-enabled solutions which protect people, assets and the environment.

We are inspired to emulate the profound societal impact that lighthouses have served communities for centuries.

Chromacity OPOs

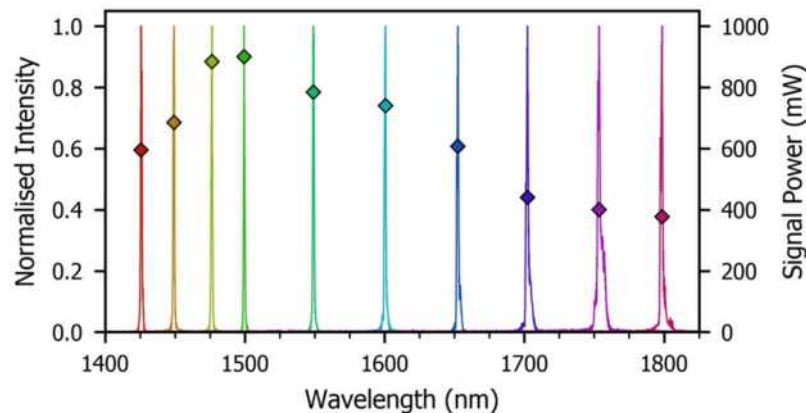
The **Chromacity Auskerry** OPO provides high power, broad bandwidth and picosecond pulsed light which can be generated across the near and mid infrared. This means the laser is ideal for a wide range of applications including **stand-off detection, IR spectroscopy, FTIR techniques, chemical and breath analysis.**

Our **high brightness Haskeir OPO** can access the molecular fingerprint region, where **chemical signatures can be uniquely identified** or 'fingerprinted'.

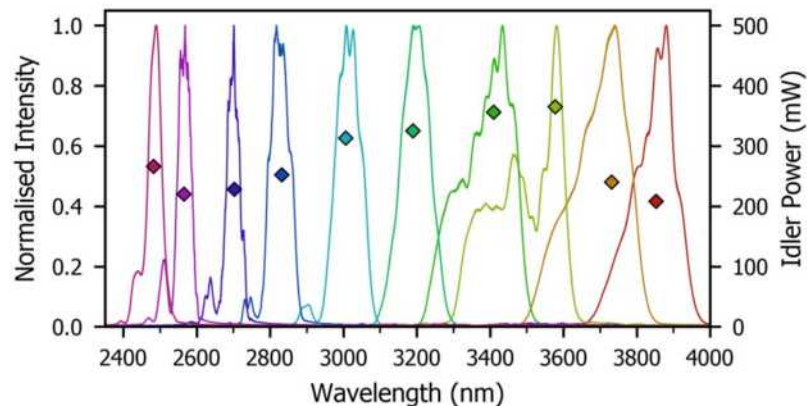


Auskerry OPO Specifications

The Auskerry OPO is an optical parametric oscillator, delivering light from 1.4 μm to 4.2 μm .



Representative Signal Output

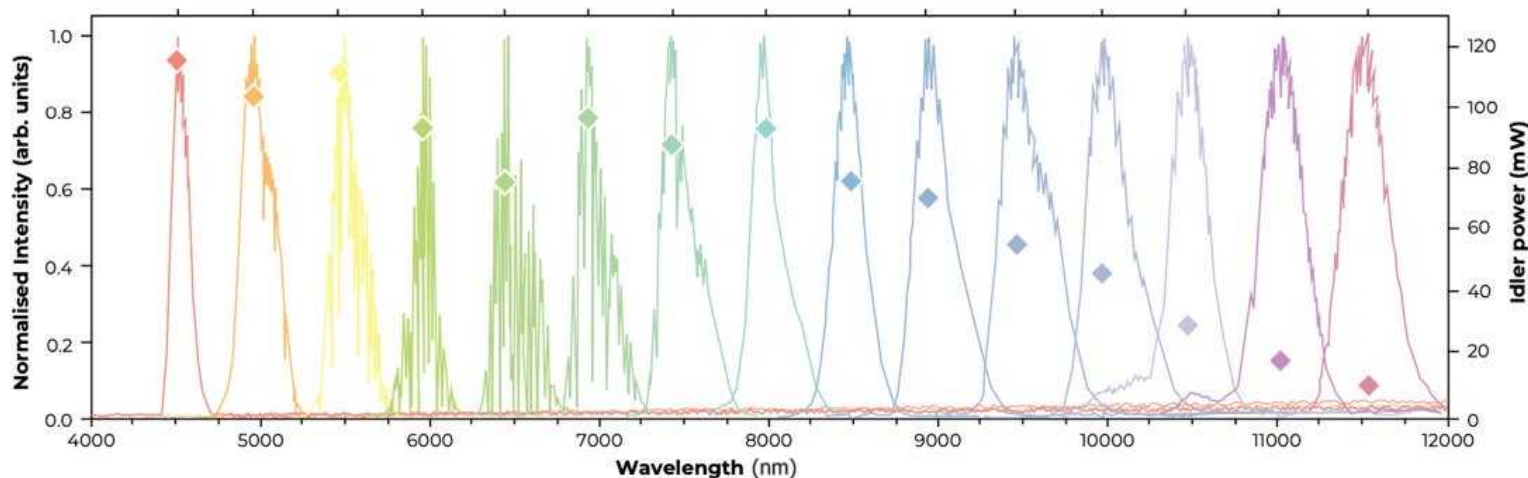


Representative Idler Output

Average Power	Wavelength	Repetition Frequency	Pulse Duration	Beam Parameters
Signal power: up to 850 mW	Signal: 1.4 μm – 1.8 μm	100 MHz	2-5 ps	Signal: 1-2 mm
Idler power: up to 350 mW	Idler: 2.4 μm – 4.2 μm	100 MHz	2-5 ps	Idler: ~6 mm

Haskeir OPO Specifications

The Haskeir OPO delivers light from 4.5 μm to 12 μm .



**Representative
Idler Output**

Average Power	Wavelength	Repetition Frequency	Pulse Duration	Beam Parameters
Idler Power : Up to 100 mW at 5-7 μm Up to 20 mW at 11 μm	4.5 μm – 12.0 μm	100 MHz	quasi-cw	Idler : ~2-3 mm

Technical Benefits - OPO

Ideal Wavelength

Auskerry OPO spans wavelengths that can be used to identify hydrocarbons & also covers telecoms wavelengths (and beyond).

Haskeir OPO spans the fingerprint regime which can be used to identify volatile organic compounds.

Long-term Stability

Pump source is fully integrated into the OPO module thus eliminating the need for end-user alignment of input pump beam.

Improved reliability for repeat experiments.

High Power

High signal-to-noise ratio for spectroscopy experiments.

Reduces requirement for high end detection systems, especially over long open-air paths.

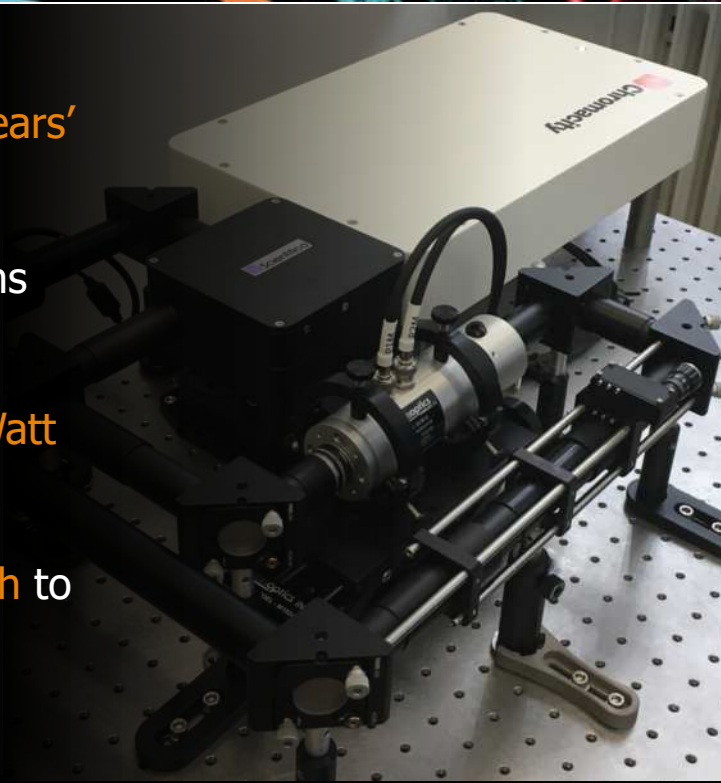
Ultrashort Pulse

Picosecond pulses generated at 100 MHz pulse repetition frequency allows time-of-flight data to be acquired.

Generates strong non-linear / quantum effects in a wide range of integrated circuits.

Technical Expertise

- We're an innovative laser manufacturer with over **70 years' combined expertise** in ultrafast-short pulse systems
- Novel design processes ensure compact, robust systems with **unique remote installation capability**
- Secured a **Strategic Relations Agreement** with **Heriot-Watt University** to accelerate IP
- In-house technical capabilities ensure an **agile approach** to **system integration** with OEM partners



Track Record



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