

The UK's premier event for photonics, imaging, lasers, optical technologies from pure research to development of bespoke advanced user solutions

Welcome to Photonics Technology News

A warm welcome to you from the Xmark organising team. This preview is a taster of technologies and products you can see at the show. In up-coming email updates we will include technical articles provided by exhibitors and many more news items will be added to the website daily. Make sure you are subscribed to receive our updates!

Not only are we presenting our 28th show to you but we are also announcing the news that Xmark Media (organiser of Photonex and Vacuum Expo) will shortly be fully integrated into SPIE, the international society for optics and photonics. This is fantastic news for UK Photonics and will ensure that the event grows significantly in the future.

To read about this and see comments by Kent Rochford, CEO of SPIE and from Laurence Devereux, Managing Director of Xmark Media Ltd and others go to: Photonex.org/news



SPECTROSCOPY

SiPM modules for fluorescence applications



KETEK's PETIA module is a convenient plug-and-play solution combining a choice of 3mm SiPM with high speed transimpedance amplifier, controllable bias source and tuneable output offset.

The PETIA module is ideal for many high speed low-light applications such as cytometry - offering users a quick and simple means of assessing the suitability of KETEK's SiPM technology and an integrated solution for high performance instruments.

Key Features are:-

- PM3325-WB (25µm) or PM3315-WB (15µm)
- 2-stage TIA, 150V/A, 12.5MHz
- Bias voltage regulation by applied 0-1V control
- Compact 20 x 50 x 40 mm³ package
- Compatible with Thorlabs® SM05 optics
- Compatible with Hamamatsu® PMT mounts

AP Technologies, Stand A15



REALITY WITH VIRTUAL REALITY

Visit Stand A12 and have a go! Live Demonstrations & Interactive Photorealistic 3D Virtual Reality

RIVR specialises in allowing one or more 'operators' to immerse in an active photo realistic 3D environment. It is possible for the operators with headsets to move around and view within a primary space and then using hand tools select and reset the absolute position of the space, allowing a much larger zone to be examined. The hand tools allow image objects to be selected and moved, stored and labelled.

As an example, this technology has been extremely helpful in forensic analysis after a fire. Selection of burnt image objects and then repositioning them to a laboratory storage environment with labelling, can enable rapid understanding of the source of the fire and subsequent effects on materials as the fire progressed.

The system is also able to network between operators and spaces. The applications for this advanced technology are extensive, come and try this out for yourself and imagine it being used in your own environment.

RIVR, try it out on Stand A12

BIOPHOTONICS | WEDNESDAY

Biophotonics and Biomedical Microscopy

The programme committee comprising Prof Amanda Wright (Oxford), Dr Michael Shaw (NPL) and Prof Sumeet Mahajan (Southampton) have again this year arranged an excellent programme for anyone wishing to learn more about biophotonics and microscopy subjects in the bio-medical/ clinical/ the life science disciplines. Last year this was said to me: "Quite honestly I think the meeting has been the best I have attended for a number of years" That's quite some statement!

Don't miss:

KEYNOTE SPEAKER

Professor Mark Leake, University of York
Molecular precise optical microscopy for complex biological questions



Why not present your work in the Poster Session?

LASERS

Ideal for quantum physics projects such as quantum sensing and laser cooling and trapping



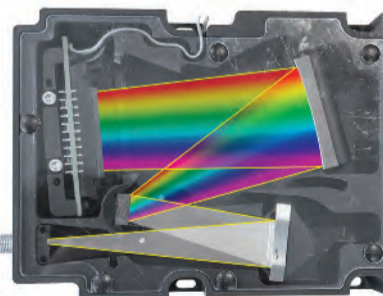
The Koheras HARMONIK system exploits a frequency-converted design to deliver powers of up to 7W, along with ultralow phase noise and <200Hz linewidth at wavelengths from 775 to 780nm. HARMONIK consists of a low-noise DFB fiber seed laser, high power EDFA, in combination with NKT's new frequency converter module. The converter module delivers simultaneously from the two output ports the frequency doubled output and the residual 1560nm.

The excellent beam quality, M₂<1.1, is suitable for cutting edge quantum physics projects such as quantum sensing and laser cooling and trapping, to mention a few.

Photonic Solutions, Stand D01

SPECTROSCOPY

Performance Miniature spectrometers



AVANTES
enlightening spectroscopy

Avantes manufacture advanced, general purpose, miniature spectrometers that are used in a variety of spectroscopic disciplines, including reflectance, transmittance, photoluminescence, Raman, fluorescence and LIBS measurements. Avantes offer several spectrometer platforms to best meet customers' price and performance requirements in the UV-VIS-NIR spectral band, from 200-1100nm and from 1000-2500nm. A full range of application-specific accessories is available, including illumination sources, fibre optic probes to complete your experimental setup.

You will find Avantes spectrometers on the Pro-Lite stand E01.



Photonics is Driving Quantum Developments and Research

PHOTONEX EUROPE 2019 is providing a major platform this year to support the significant rapid growth and evolution of Quantum Technologies. A specialised Quantum Technologies Zone will have the latest R&D and incubator products on show and allow networking of ideas. The main Photonics exhibition will enable visitors to engage with the latest advanced products used to provide and control quantum states. A zone is also provided for advanced materials, semiconductors and for supporting the silicon photonics community who are holding their 'Picture' H2020 project meeting on Wednesday. Additionally, the technology of thin films is well covered in a comprehensive co-located vacuum technology, Vacuum

Expo, exhibition. All of these are complimentary subjects, key for quantum technology developments.

There will be:

- Demonstrations on exhibitor's stands.
- A programme by EPIC 'The Quantum Photonics Revolution' (Wednesday).
- A programme on 'Cold Atoms for Quantum Technologies' (Thursday).



In addition, The Enterprise Zone enables:

- Interaction and discussion on business opportunities, investment and funding

DO NOT MISS THIS OPPORTUNITY!

Photonics Contributes to Quantum Technology

Photonics is a major and key contributor to quantum technology growth in several research and development disciplines.

There are a large range of photonic products which enable analysis and control of quantum states, dynamics and structure. Laser technology now provides quantum research with advanced performance, including ultra-high resolution in wavelength, femtosecond speeds and a variety of useful power levels. Solid state lasers are becoming much smaller, which is key to the design and development of practical end-user products for integration into sub-assemblies. Photonic detectors have recently advanced and taken a leap forward providing the necessary performance for quantum related analysis and

development, with improved signal-to-noise, responsivity and ability to detect single photon events. Supporting photonics products which enable a working system can include, micro and piezo alignment devices, optics and optical coatings, beam steering, shuttering, anti-vibration tables to mention just a few.

Photonex Europe with its major exhibition of photonics products will enable you to see and discuss with experts the very latest items useful for quantum research and developments towards user products.

The event brings together the whole industry under one roof; researchers, industrial users, science groups, supplier companies and innovative new-comers.

Quantum Technologies Specialist Zone

QUANTUM SCIENCES NETWORKING · DISCOVER QUANTUM TECHNOLOGY FUNDING and INVESTMENT · COLLABORATION · BUSINESS OPPORTUNITIES

This specialist zone of the exhibition is for research groups to demonstrate and discuss their latest work. While university research groups will be present, so will the spin out companies that are moving forward new applied product developments. They will be keen to use their expertise to discuss new projects and contracts with Industry and Government sector visitors. The outstanding work to date by participants in this zone will be on display and there is a significant opportunity to explore collaboration opportunities and for networking with the main photonics exhibitors.

The zone will include representatives from the national network of Quantum Technology Hubs, which are part of the £270 million UK national quantum technologies programme supporting this important evolving growth sector.

THE 4 HUBS ARE:



Future Potential New Applications for Quantum Technologies

- COMPUTING, COMMUNICATION and SECURITY
- SENSORS and METROLOGY
- QUANTUM IMAGING
- METROLOGY OF ROTATION and TIME [CLOCKS]

The Photonex two-day exhibition will enable first hand appreciation of the extent of this new technology, the extensive potential for this technology, will allow you first hand networking, development of ideas, an overview of investment and funding to support new products.

An overview of these applications is available at www.photonex.org/quantum

SILICON PHOTONICS | WEDNESDAY

Industry & Academia: Working Together in Silicon Photonics

In this third meeting the Horizon 2020 PICTURE project, which is coordinated by III-V LAB in France will be featured.

Don't miss:

KEYNOTE SPEAKER

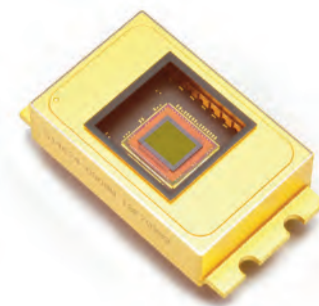
Professor Laurent Vivien, University Paris Sud, France

Which perspectives for silicon photonics



IMAGING

New InGaAs Sensors for hyperspectral cameras



Hamamatsu Photonics has developed an InGaAs area image sensor for hyperspectral cameras capable of detecting short-wavelength-infrared light up to 2.55 µm

which is the world's longest wavelength detectable by this type of area image sensor. By applying compound opto-semiconductor manufacturing technology fostered in-house over many years, we designed and developed a new area image sensor G14674-0808W made of indium gallium arsenide (InGaAs) capable of detecting short-wavelength-infrared light up to 2.55 µm (micrometers or one millionth of a meter) which is the world's longest wavelength detectable by this type of area image sensor. Installing this new InGaAs area image sensor into hyperspectral cameras for plastic recycling will boost the plastic recycling rate since hyperspectral cameras can screen and sort plastics containing flame-retardant resin to separate them out from other plastics, which has been extremely difficult up till now.

Hamamatsu Photonics, Stand C01

MASTERCLASSES

Masterclass on Lasers



Masterclass on Lidar



Masterclass on Optical Standards



IMAGING/QT

Novel molecular movie camera



QuantIC, the UK Quantum Technology Hub in Quantum Enhanced imaging, and Horiba have developed a novel molecular camera which enables real-time video rate studies of the fundamental cellular processes that are critical to biology and healthcare.

The new fluorescence lifetime imaging (FLIM) camera uses a 192 x 128 pixel array which allows each pixel to have an individual detector and its own time-correlated single-photon counting (TCSPC) timing circuitry. Horiba has developed bespoke firmware and software and integrated it into existing commercial system to produce a wide field FLIM camera for microscopy. The parallel nature of the fluorescence data acquisition means that it is over an order of magnitude faster than conventional scanning FLIM microscopes. The result enables real time video rate FLIM to be realised, thereby permitting the study of mobile samples such as live cells and fluid biopsy for cancer screening.

HORIBA, Stand E12

How Quantum Cryptography Works

An application field for COUNT® Modules

Data security and data exchange are topics with increasing importance. How do you prevent data from being intercepted by a third party? The solution lies in cryptography: The message must be encoded. But what if the key exchange is intercepted? This is where quantum cryptography comes into play.

The idea behind so-called quantum key distribution (QKD) is to use single photons instead of entire photon bundles. This way an eavesdropper (referred to as "Eve" in quantum mechanics) cannot simply divert the photons that are sent from Person A to Person B (referred to as "Alice" and "Bob," respectively, in quantum mechanics). Eve would have to copy and then detect the photons to prevent the interception from being detected by Bob. This is precisely what quantum mechanics renders impossible (the so-called "no cloning theorem").

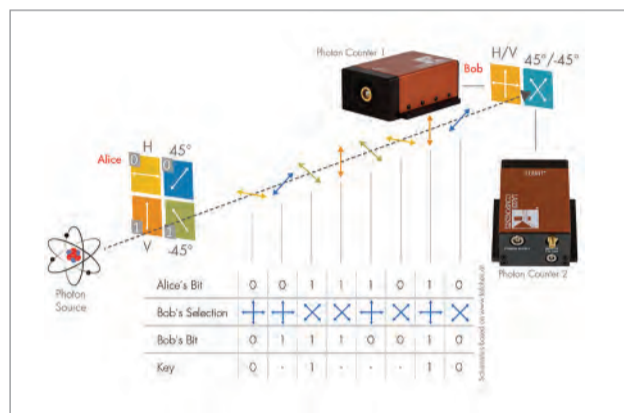


Figure 1 Schematics of the quantum key

Figure 1 depicts what key generation for coding and decoding data can look like. This so-called BB84 protocol (developed by Bennett and Brassard in 1984) uses the polarization of photons as a means of generating a key sequence. Alice selects one of four polarization states – H (horizontal), V (vertical), +45°, and -45° – and sends such a photon to Bob. She must first indicate which bit value the two orthogonally arranged polarization states have: 0 or 1. In our example, H corresponds to 0, V corresponds to 1, 45° correspond to 0, and -45° correspond to 1. If Bob receives such a photon, he decides whether to measure based on H/V or 45°/-45° and ultimately makes a note of the polarization state (and thus the bit value) of the photon. Bob communicates with Alice in the classic sense, and they compare their base selection. This information, which is of no use to Eve because she does not know the exact results, is sufficient for Alice and Bob

IMAGING

Photonic Solutions now seeing in Terahertz



Photonic Solutions invites you to review TZcam – a high definition, real-time Terahertz camera with the highest sensitivity on the market.

The TZcam is based on antenna-coupled microbolometer technology which can

measure from 0.3THz to 5THz with unprecedented sensor sensitivity and resolution.

This new technology has opened up many exciting applications. Ideally suited to the industrial demand for material inspection, the TZcam can be used for real time, non-destructive imaging of plastic, ceramic, composites, polymers, wood, cardboard and paper, textile fibres and leather. The TZcam is also essential for any laboratory or R&D institution that carries out research in the field of THz waves, be it for use in medical imaging, oncology, etc, or for visualisation/qualification of your terahertz laser source.

Photonic Solutions, Stand D01



COUNT® single photon counting module

to determine which bit values they can use for their key.

A further development of the BB84 protocol uses entangled photons, which strongly correlate in their properties, that are sent from a single source to Alice and Bob simultaneously. One such source was developed, for example, by experimental physicists in Prof. Weihs' photonics group at the University of Innsbruck: a pulsed Sagnac source of polarization-entangled photons (see www.uibk.ac.at/exphys/photonic/people/parametric-downconversion.html). Here a nonlinear crystal is used that produces two lower-energy photons at a wavelength of 808 nm from a higher-energy photon at 404 nm. The photons are detected using two "COUNT" SPADs by LASER COMPONENTS.

As secure as these methods are in theory, in practice there is a lot of room for error. The most significant sources of error are the single photon detectors that Alice and Bob use. In theory, the available detectors are perfect, identical, and have a detection efficiency of 100%; however, in practice, this is never the case. It is precisely this discrepancy in the detection efficiency of two detectors that quantum hackers use to access the key. An alternative method "blinds" the SPADs with the help of a light pulse and uses the "blind time" of the detector to intercept information (see www.arxiv.org/pdf/1008.4593v2.pdf).

Thanks to the identification of sources of error by quantum hackers, research groups have been able to work on approaches for solutions to these problems and develop a "measurement unit-independent" version of the QKD. The industry can also contribute to making the methods more efficient and precise. The constant exchange between research and industry is thus extremely important.

Learn more about COUNT® single photon counting module and fibre optics components on Laser Components Stand D15



SPECTROSCOPY

Raman spectrometers with extended range.



Wasatch Photonics presents its new WP532ER and WP785ER Raman spectrometers for those spectroscopists, who dare to go beyond the limits... of the usual Raman shifts range provided by compact spectrometers!

These extended range Raman spectrometers allow the user to characterize molecules up to 3500cm⁻¹ with the WP735ER or even beyond 4000cm⁻¹ with the WP532ER. This is extremely useful to identify bands related to some stretching modes, such as O-H, N-H or high saturated bonds. It also provides more reliable matches between experimental data and reference spectra in order to identify molecules, by comparing a less crowded fingerprint region.

See Wasatch on Pro-Lite's stand E01

ENTERPRISE

Find out how our unique combination of the state-of-the-art assets and expertise can support your innovation journey



In March CPI launched its National Healthcare Photonics Centre, a new facility focused on the development of next generation light-based healthcare treatments.

The Centre will support the scale-up and commercialisation of photonics-enabled technology, acting as a hub for businesses of all sizes and academic partners to work on innovative methods of diagnosing disease, imaging systems and light-based treatments. The aim of the facility is to reduce the barriers that are preventing promising research and early-stage inventions from moving beyond the laboratory and into innovative healthcare solutions for patients.

As well as commissioning work or participating in collaborative development projects, companies will be able to locate onsite and work alongside CPI's highly skilled team.

CPI photonics assets support applications destined for a whole range of markets. Find out more about working with CPI on your photonics-enabled innovation by visiting us in The Enterprise Zone at Photonex.

CPI, Stand E15

LASERS

Long distance alignment laser system



Lasers are widely used for alignment applications in workshops and factories. The range of outputs such as dot, line and cross together with a choice of beam colour cater for a very diverse range of alignment possibilities. Applications can be found in an extensive

range of industries including electronics, medical, metal working, wood working, the paper industry as well as with stone, glass and ceramics. However these alignment lasers are limited to alignment over a distance of only several meters.

There are applications in shipbuilding, aircraft construction and the vehicle manufacturing industry, which require alignment over much longer distances. For such applications Scitec Instruments offers the OT-4040 alignment laser system from On-Trak Photonics.

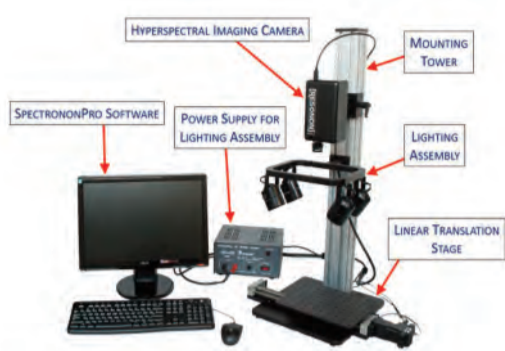
The OT-4040 alignment laser system is a powerful way to perform accurate alignment measurements over distances of up to 100 metres. It enables measurement of X-Y deviation in real-time at any point on a visible laser reference line. A "transparent" measurement target can be inserted into any standard NAS tooling sphere along the reference line, and a reading taken with the attached central processing unit. The OT-4040 is widely used by aircraft manufacturers, shipbuilders, and the automotive industry.

Scitec Instruments, stand B21



IMAGING

Photon Lines to present new, advanced, Hyperspectral Solutions



Photon Lines Ltd will be demonstrating a new benchtop hyperspectral imaging system from Resonon Inc, which will be supported by a presentation at the dedicated Hyperspectral Imaging conference at the venue on Thursday 10th October, 2019. The subject of the talk will be 'Signal-to-noise ratio of push-broom imaging spectrometers', and this will be presented by a member of the Resonon team who will have the very latest information on current developments, and be available to discuss proposed customer applications and assist with any questions.

New and novel uses for HSI continue to grow, and these include analysis of foodstuffs, agriculture, the environment (for example health of the tree canopy) and plastics sorting for recycling.

Photon Lines, Stand C02

IMAGING

Getting under the skin of the X6900



Written by Matthew Clavey

When FLIR launches a new thermal imaging camera I can't but help feel a twinge of excitement. I am a gadget geek – so when FLIR announced it was launching the world's fastest full frame IR camera you can imagine how eager I was to lay my hands on one.

I'm always fascinated to find out what's new, what's not been done before and what new thermal imaging technology can deliver for my clients in the R&D sector. Well the X6900 hasn't disappointed. For starters, there are no other cameras in the world like it. There is currently nothing on the market which captures high speed data as full 640 x 512 frame images – and as exciting as that is, from the second it launched, I was chomping the bit to find out what else it could do.

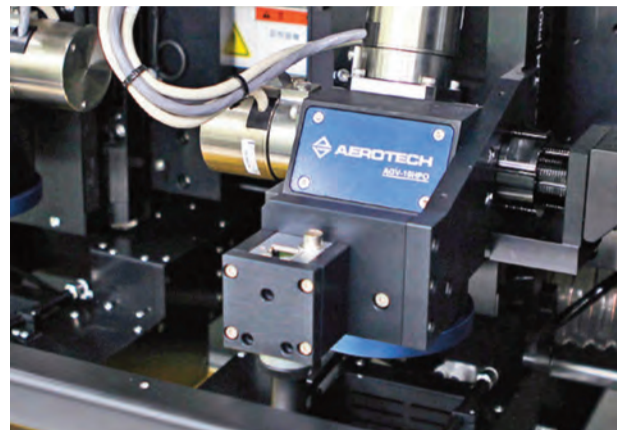
So, here are three cool things I've discovered; it has a Preset Sequencing Mode, it has Advanced Time Controls and it has an Integrate While Read Mode.

Those are just a few of the tricks the X6900 has up its sleeve, but trust me, there's so much more it can do... and therefore so many reasons why you should own one! But hey, come see us at Photonex Europe and we can show you the camera, you can have play with it and we can have a chat about what it could do for you."

Thermal Vision Research, Stand E02

MOTION

Combine Motion of Galvo Scanners & Servo Systems with Aerotech's Infinite Field of View



Aerotech's Infinite Field of View (IFOV) is a unique and industry-leading solution for the synchronization of linear or rotary servo axes with laser scanners. IFOV produces significant throughput improvements and eliminates stitching errors and part quality issues due to overlapped and mismatched laser processing.

Read a full article on the Photonex website or come to the exhibition to meet Aerotech, Stand E24

MASTERCLASS

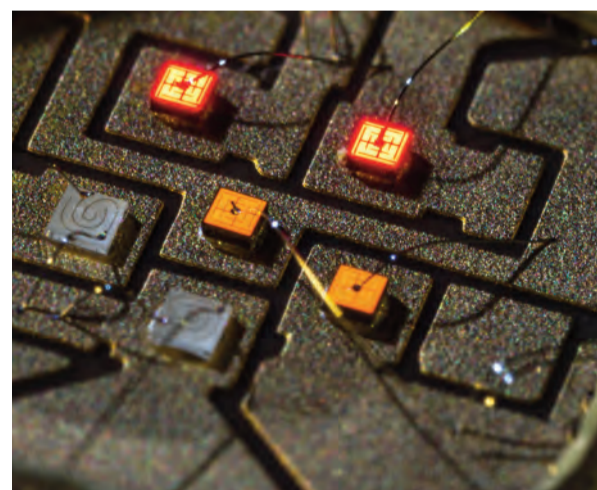
Join Aerotech's Motion Academy

This masterclass will help researchers and industry experts define their precision motion needs in terms of their application requirements – improving their processes and increasing their level of success.

Thursday, Theatre 3

OPTOELECTRONICS

Multi-wavelengths LEDs for analytical instruments



As an alternative to conventional light sources which are often used with integrated band-pass filters, EPIGAP Optronics offers a range of adapted multi-wavelength LEDs.

Depending on customer requirements SP3 Plus can offer different wavelength combinations in various packages and designs.

A selection of recently implemented projects include: 7 chip TO package with and without lens for medical analyser, flat-top spectrum 370-470nm, 49 chip CoB for food analysis, 9 wavelengths SMD with a dimension of 8x8 mm.

Meet SP3 Plus, the UK partner for EPIGAP on Stand F20

CONFERENCE | WEDNESDAY & THURSDAY IEEE High Power Diode Lasers & Systems Conference



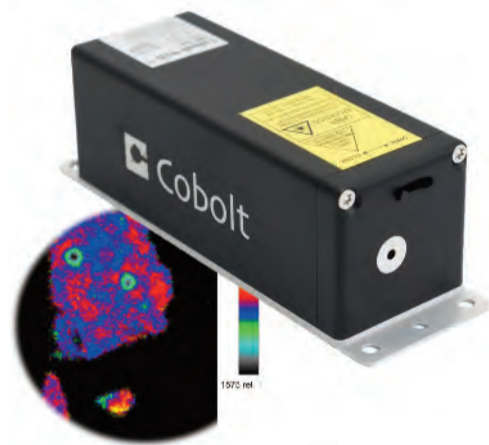
KEYNOTE SPEAKER

Prof Stephen Sweeney, University of Surrey, UK
The impact of carrier recombination and loss processes on high efficiency and high power lasers
With speakers for Finland, France, Germany, UK, USA

Why not present your work in the Poster Session?

LASERS

New wavelengths for Raman and Ar+ replacement multi-line lasers



HÜBNER Photonics, with the Cobolt product line, highlights this year the addition of 633 nm and 785 nm single transverse mode (STM) to their range. The addition of these wavelengths aims to secure the market position as a major supplier of all laser wavelengths to the high resolution Raman market.

Continuing to address the fluorescence microscopy market, we introduce a variation of the Cobolt multi-line laser, the Cobolt Skyra™. With 457 nm, 488 nm and 515 nm, permanently aligned in a single compact package, the 3 line Cobolt Skyra™ becomes a simple drop in replacement to the older generation of Argon ion gas lasers thereby potentially extending the life of older fluorescence based systems in life science research.

HÜBNER Photonics, Stand F11

Join us on social media!



CO-LOCATED WITH

10thYear
VacuumExpo

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