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Investment hopefuls give IIP forum their best shot

17 Oct 2014

*Start-ups aim for the top with elevator pitches at Invest In Photonics event.*

At the **Invest in Photonics** forum in Bordeaux, last week, among the talks by industry experts, analysts and investors, there were regular bursts of presentational activity from 16 start-ups and relatively new photonics companies.

As well as showing what they could do to revolutionize the marketplace, there were polite requests for a total of more than €72 million (\$90 million) of investment. *Optics.org* heard them all and here presents a sample from across Europe.

**LUXeXceL, Goes, Netherlands**

Just a week before the IIP conference, **LUXeXceL** announced both the launch of a new additive manufacturing platform to deliver high speed and precision and a new clear material "LUX-Opticlear", which enables high quality optics manufacturing up to 20mm in height.

With these new capabilities, the company says its "LUXeXceL process" is ready to compete with injection molding for the production of small and mid-sized series of optical components. The company is now offering a fast and effective service for prototyping, iterating and the manufacturing of optics, cutting out the need for costly and inflexible tooling.

In his elevator pitch to the gathering in Bordeaux, President and founder Richard van de Vrie, commented, "Our **Printoptical technology** has attained a new level. The fully digital process, provides freedom for iteration, speed, accuracy and competitive pricing for both

prototyping and small to medium volume manufacturing.

"Our technology is different from traditional 3D laser printing," he said. "We are not doing layer upon layer, which never achieves a good surface and requires post-processing. No, we have a different technology where we use droplets and put them on mounts."

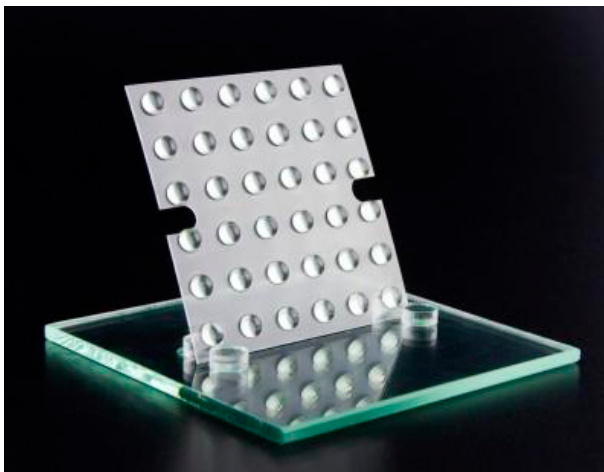
"Besides that, there's our software which follows the CAD file, to determine which droplet will be used like Lego bricks to build up the optic, and chooses which ones to let flow to create the perfect smooth surface without the need for post-processing."

"We are focusing now on the LED lighting industry. The LED lighting industry that we know, where we like to solve all the problems, where we use manufacturing as a service."

So what was LUXeXceL looking for amongst the venture capitalists and corporate investors at the IIP conference? Like all of the other elevator pitchers, van de Vrie wants further investment in his company: "We are



LUXeXceL's Richard van de Vrie.



LUXeXceL's 3D additive process can make optical components.

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looking for investors and we are looking for between three and five million euros of external funding. Exit routes will be either an IPO or the creation of multiple, strategic sales to various markets."

#### **Multiphoton Optics, Niedernberg, Germany**

**Multiphoton Optics** develops and sells high-performance 3D laser lithography equipment based on two-photon absorption processes. Dr. Ruth Houbertz, CEO, said the technology is "a breakthrough for laser-to-fiber coupling and addresses the telecom and datacom markets as well as emerging biomedical markets."

Multiphoton Optics is a 2013 start-up from the **Fraunhofer Institute for Silicate Research (ISC)**. The company is currently providing photonics manufacturing services for demonstration and small volume production to first customers.

In her pitch to IIP, Dr. Houbertz, said, "We supply a process that automates high-precision opto-electronics assembly and allows interconnecting optical components, silicon or III-V photonic chips, and the creation of novel optical component packages."

"The process addresses one of the major bottlenecks in photonic packaging and allows creating a high volume manufacturing process chain for packaging of photonic components like VCSELs, Silicon Photonic chips, and others."

So what are the key markets for this technology? Typically, data centers or for interconnects within high-performance computers, so customers range from optical chip to optical equipment manufacturers. Houbertz said, "These situations have tremendous energy consumption so the challenge is to provide scalability in optical packages. Our MPO process provides scalable processes to achieve this as well as superior alignment capabilities."

"We are presently organizing a contract with a large telecoms contractor and the licenses contract is already done. Revenue is based on equipment sales, and we are selling into what we believe is a €2 billion-plus market sector."

Asked what had changed at the company between winning the seed funding of €700,000 and her latest request for €2.5 million, Houbertz replied, "We now have customers already lined up. What has changed is that we already have customers, we need to hire further personnel and to further develop our production but also our sales."

#### **Azur Light Systems**

**Azur Light Systems (ALS)** is based on the outskirts of Bordeaux in Pessac, at the heart of the **Route des Lasers** cluster. Exploiting innovative technology developed by the University of Bordeaux and the ALPhANOV technology platform, ALS develops fiber laser technology - including the first blue emitting model - for scientific, industrial and biomedical applications.

Nicholas Traynor CEO, enthusiastically told the conference, "Fiber lasers are fabulous. Of course, I would say that, but our customers generally seem to agree and the market certainly seems to support that hypothesis."

"At Azur, we like doing things differently. For example, we developed the world's first blue fiber laser. What we can see today is that 90% of the fiber laser market is about materials processing, so our idea is to introduce what we call wavelength agility in order to take our lasers into new markets such as instrumentation, scientific and defense applications, and medical devices."

"Today, fiber laser applications really rely on power but what we believe is that wavelength agility is going to open up the markets currently occupied by gas lasers, which are on the wane. Fiber lasers are a good candidate to replace them."

Considering ALS's financial position, Traynor said the company is, "cash-flow positive and stable, which is a very nice position to be in for somebody who created the company only four years ago."

Moving on to his bid for further investment, Traynor added, "There are more opportunities and prospects than we can handle at the moment; we have some good products with high value and good geographic presence but there is a need for more distribution. And we think with a bit more financing - [the company raised €800,000 about three years ago] - we believe that we can double sales within three to four years, if we get the right kind of financing."

"The indicators are positive - we feel that there is more worth in our business. We're very happy where we are, we're having a good time, which is important. The business is profitable and we have growth. But we are asking ourselves the question can we find a win-win situation with further financing - we think our sweet spot in terms of valuation is within fiber lasers, which is driving us."

#### **Class 5 Photonics**

**Class 5 Photonics**, Hamburg,



Multiphoton Optics' Ruth Houbertz.



Azur Light Systems' Nicholas Traynor.

Germany, is spin-off company of from DESY (Deutsches Elektronen-Synchrotron) and Helmholtz Institute, Jena. It develops high power femtosecond lasers based on optical parametric chirped-pulse amplification (OPCPA).

CEO Robert Riedel described OPCPA to the IIP conference as, "a future-enabling technology. It provides tunable, femtosecond pulse duration

at high powers, making it possible to reduce experimental or industrial processing times by a factor of 10-100, compared to conventional titanium-sapphire technology."

"We plan to provide OPCPA-systems, upgrade modules and individual custom-built laser amplifiers to fit client's experimental or industrial needs, with pulse energies ranging from 1  $\mu$ J to 1 mJ, pulse durations shorter than 15 fs, and power up to 100 W. As a reference customer, we have already provided a conceptual design for the high repetition rate OPCPA laser for the **Extreme Light Infrastructure** Attosecond Light Pulse Source, in Hungary."



Class 5 Photonics' Robert Riedel.

"Our vision is to enter also the industrial market by pumping creative laser-based fabrication methods, such as 3D nano-fabrication with our femtosecond laser sources. Our aim is to be the technology leader in developing high-power femtosecond lasers.

"What is our market? Today we focus directly on the research market – because there are development areas of interest, such as ultrafast spectroscopy, attosecond science, terahertz generation, it's real cutting edge science. In these applications, people need more power to increase their research objectives and productivity. Some of these projects take days or even weeks and we can achieve ten times faster data acquisition because of our higher power, which is a significant improvement.

So what is different about Class 5 Photonics' approach to femto second pulse development? He explained, "The current state-of-the-art technology is a Ti:Sa oscillator, which is the only technology delivering fs pulses. But there's a hard limitation on average power to a few tens of watts. We use a different approach – we use a nonlinear amplification method. So compared to the 10W output we can go to a factor of 10 higher or even more; we have many patents on our technology.

#### Financial aims

Class 5 has already raised about €300,000 by a Government grant. Riedel describes the company as currently being in the prototype development phase, but, "we are talking to clients and our sales for the next two years are just about planned. We would like to enter the industrial markets and we would need to raise a further investment of about one million dollars – not today but within the scope of the next one to two years, to be suitable to take the technology for high-powered industrial applications."

#### About the Author

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