

# PRESS RELEASE



## **New emitters to enhance the cost performance and environmental-friendliness of OLED lighting**

Exploiting ground-breaking research in the field of thermally activated delayed fluorescence (TADF), the new €4M PHEBE project aims to develop innovative, high-efficiency, blue emitters for white organic light emitting diodes (OLEDs). While OLEDs are already an efficient and resource-saving illumination system, the new emitters are expected to significantly enhance their cost performance and environmental-friendliness.

Today, two key issues prevent current iridium-based, phosphorescent OLED emitters from gaining a major fraction of the world lighting markets. Firstly, iridium is the fourth rarest naturally-occurring element on the planet, so basing a large-scale, high-volume lighting industry on this resource is risky as well as detrimental to the environment. Secondly, iridium-based blue phosphor devices have short working lifetimes and low energy efficacy that are well-below industry expectations.

However, recent research by the Durham University on intramolecular charge transfer systems that enable TADF (ICT-TADF) and intermolecular exciplex charge transfer systems that enable TADF (Exciplex-TADF) has demonstrated very promising improvements in energy efficacy. Also, these molecular systems do not use iridium.

Tackling these issues and new field of research, the PHEBE project is being undertaken by a strong and multidisciplinary consortium of partners spanning the development and commercialisation of the new emitters: OLED lighting research organisations (TU Dresden, Kaunas University of Technology and Durham University), OLED material and technology expert (Novaled), and OLED lighting device manufacturer (Astron-FIAMM).

Specifically, TU Dresden is focusing on material design using theoretical quantum chemical approaches during the project's material development cycle. KTU is elaborating synthetic schemes for exciplex emitters and intramolecular charge transfer materials and synthesizing the most promising compounds. Time resolved spectroscopy and materials characterization is being provided by the Durham University.

Meanwhile, Novaled is providing best-fit transport and doping material sets, technology and expert know-how on stack architecture and Astron-FIAMM is ensuring the project's goals are aligned with market needs and will produce OLED lighting modules demonstrators to illustrate the end results.

Lastly, the project coordinator, Intelligentsia Consultants will conduct a life cycle assessment to evaluate and compare the new OLEDs.

The PHEBE project is funded by the European Commission under the Horizon 2020 ICT programme. It started on February 1<sup>st</sup> 2015 and will run for 3 years.

### **About Novaled**

Novaled GmbH is a leader in the research, development and commercialization of technologies and materials that enhance the performance of OLEDs (organic light-emitting diodes) and other organic electronics. Novaled offers OLED product manufacturers a unique combination of proprietary technology, materials and expertise, and is currently the only company in the OLED industry licensing and selling organic conductivity doping technology and materials for use in the commercial mass production of display products. Novaled has developed strategic partnerships with key OLED innovators and producers throughout the world and, with a broad portfolio of more

than 500 patents granted or pending, has a strong IP position in OLED technologies, structures and materials. Novalled is headquartered in Dresden with offices in Asia.

[www.novaled.com](http://www.novaled.com)

#### **About Astron-FIAMM**

Astron-FIAMM is a leading manufacturer and a pioneer of OLED lighting. Astron-FIAMM has created the brand Blackbody for high-end interior lighting OLED products conceived by world-famous designers. Since 2010, the best-selling customizable chandelier iRain, has been sold in over 20 different countries. Astron-FIAMM is also pursuing active collaboration with several carmakers to develop signature OLED lighting for automobiles. The production unit and offices are located in Toulon, France.

[www.astron-fiamm.com](http://www.astron-fiamm.com)

[www.blackbody-oled.com](http://www.blackbody-oled.com)

#### **About Durham University**

The Durham University is a world top 100 university with a global reputation and performance in research and education. It is a member of the Russell Group of leading research-intensive UK universities. Research at Durham shapes local, national and international agendas, and directly informs the teaching of our students. It was ranked in the world top 25 for the employability of its students by blue-chip companies world-wide (QS World University Rankings 2014/15) and in the global top 50 for Arts and Humanities (THE World University Rankings 2013/14). In the 2015 Complete University Guide, Durham was the only UK university to receive a top ten ranking for all of its subjects and 19 of Durham's 22 subjects were ranked in the top five. Furthermore, Durham was named as The Times and Sunday Times 'Sports University of the Year 2015' in recognition of outstanding performance in both the research and teaching of sport, and student and community participation in sport at all levels.

[www.dur.ac.uk](http://www.dur.ac.uk)

#### **About Technische Universität Dresden**

The TU Dresden is one of eleven German universities that were identified by the German government as an 'excellence university'. As a modern full-status university with 5 schools, it offers a wide academic range making it one of the most diverse universities in Germany. The Institut für Angewandte Photophysik (IAPP) was founded in 1908 and it is involved in field of organic semiconductors since 1985. The IAPP has broad experience in the investigation of physical properties of organic molecules, and their application in organic optoelectronic devices, such as organic light-emitting diodes and organic solar cells. Nowadays, it has more than 130 employees. The IAPP has an excellent international reputation, it initiated several industrial spin-off companies (among them Novalled, Heliatek, CreaPhys, and Sim4Tec), and its members have received numerous awards in the field of organic electronics, including the German Future Prize (endowed 250.000€), awarded by the President of Germany. The IAPP is the core basic research laboratory of the Organic Electronics Saxony ([www.oes-net.de](http://www.oes-net.de)), Europe's largest organic electronics cluster.

[www.iapp.de](http://www.iapp.de)

[tu-dresden.de](http://tu-dresden.de)

#### **About Kaunas University of Technology**

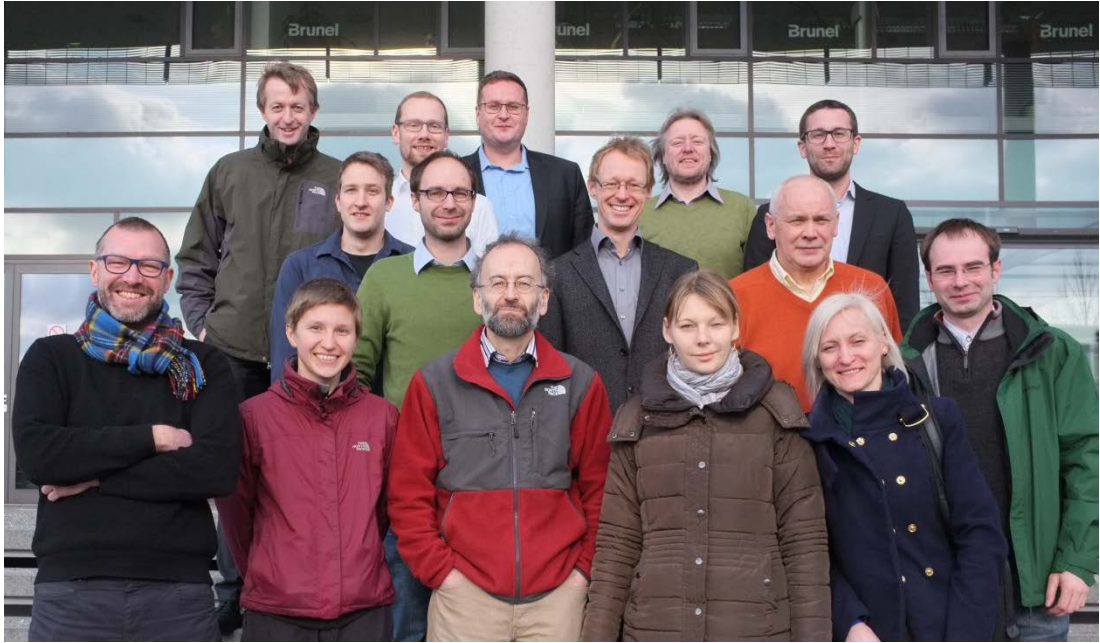
Kaunas University of Technology (KTU), established in 1922, has developed a great capacity for studies and research and is now a leading technological university in Lithuania focusing its activities on enhancing the quality of human life and acceleration of statehood development. KTU is situated in Kaunas, the second largest city of Lithuania and a significant centre of industry, transport, science and culture. KTU has 9 faculties, 10 research institutes with 5 centres and number of research labs. The University staff consists of approximately 1.000 academic staff, including 145 professors, 441 associated professors and research fellows. Kaunas University of Technology with its numerous research centres is the second largest university in Lithuania. Some 80% of Lithuania's industrial engineers have graduated KTU.

[ktu.edu](http://ktu.edu)

#### **About Intelligentsia Consultants**

Intelligentsia Consultants provide high-quality, knowledge-based consultancy services to support research and innovation in private and public organisations. Their range of consultancy services covers the following areas: Grant Proposal Writing, R&D Tax Relief, European Programmes, National Funding, Training, Project Management, Technology Transfer and Other Services, such as Web Development.

[www.intelligentsia-consultants.com](http://www.intelligentsia-consultants.com)



**PHEBE project partners at the kick-off meeting in Dresden**