OSCAR NETWORK MEETING

The Scientific Committee of the OSCAR international research network is organizing a kickoff meeting from November 25 to 27, 2026, at the Faculty of Sciences, with about 50 researchers in attendance.

The OSCAR international research network (Organic Semiconductors in Microcavities for Advanced Research: Beyond OLEDs: Design and Utilization of Organic Electroluminescent Materials for Quantum Technologies) aims to promote interdisciplinary collaborations and foster stimulating scientific discussions around the general theme of “Emerging Challenges in the Field of Organic Semiconductor-Based Electroluminescent Devices Beyond OLEDs.” Specific areas of interest include organic semiconductor lasers, OLEDs, and polariton lasers, as well as quantum light sources. The meeting will be held in conjunction with the Swiss-Japanese JSPS-SNSF Symposium on Organic Semiconductor Lasers, thereby offering further opportunities for scientific exchange and collaboration.

3 Questions for David Kreher, Director of the Lavoisier Institute in Versailles and co-principal investigator of the project :
1/ What is the OSCAR project about?
The collaborative project “Organic Semiconductors in (micro)-Cavities for Advanced Research (OSCAR): Beyond OLEDs, designing and harnessing organic light-emitting materials toward quantum technologies” is a new international research network (IRN)

supported by the CNRS for the period from 2026 to the end of 2030.
To provide some scientific context, for nearly 30 years, organic semiconductors (OSCs) have played a vital role in photonics and electronics as alternatives to inorganic or hybrid materials, already delivering exceptional performance in applications such as organic light-emitting diodes (OLEDs), for example.
However, even though nearly all optoelectronic devices have been successfully developed in the organic field, certain transitions have proven to be much more complex than anticipated, particularly the development of the organic laser diode. Furthermore, beyond the challenge of adapting existing concepts to the organic realm, it is also possible to create novel structures using -conjugated organic molecules—structures that cannot be realized with inorganic materials. In fact, while it is quite complicated to explain, OSCs inherently exhibit high exciton binding energies at room temperature, which can promote strong light-matter coupling—a property that can be harnessed to develop, among other things, organic solar cells (OSCs) that are fully integrated into the field of quantum technologies.
In summary, there remain numerous opportunities in the future to develop materials and device architectures that exploit the emissive properties of organic semiconductors, going beyond conventional large-area OLEDs operating in the visible spectrum. This ambition is at the heart of OSCAR.

2/ Who are the partners involved?
To make these ambitions a reality, close collaboration between physicists and chemists is essential to guide the design and development of materials suited to these emerging applications. This IRN is therefore jointly led by the Laser Physics Laboratory (UMR 7538, Sorbonne Paris Nord University, Villetaneuse, Prof. Sébastien Chénais) and the Lavoisier Institute of Versailles (UMR 8180, Versailles Saint-Quentin - Paris-Saclay, Prof. David Kreher), thereby highlighting the highly interdisciplinary nature of its objectives.
We will also draw on several key partners who contributed to the establishment of this network, namely:

- The Paris Institute of Molecular Chemistry (UMR 8232), Sorbonne University (Dr. Jan Patrick Calupitan and his colleagues)
- The Humboldt Center for Nano- and Biophotonics, University of Cologne (Germany, Prof. Malte Gather’s group) The Center for Organic Photonics & Electronics, School of
- Mathematics and Physics, The University of Queensland, St. Lucia Campus, Brisbane (Australia, Prof. Ebinazar Namdas’s team)

- The Center for Organic Photonics and Electronics Research (OPERA), Kyushu University, Fukuoka (Japan, Prof. Chihaya Adachi's institute)
- The CNRS International Research Laboratory (IRL) "OPHELIA," Kyushu University, Fukuoka (Japan, IRL led by Dr. Fabrice Mathevet)

Of course, our goal is to bring together and pool all the expertise necessary for the success of this IRN, so I hope other colleagues and institutions will join us.

3/ What are the prospects over the next 5 years (the project's duration)?
With polariton laser emission and associated phenomena—which involve hybrid states of light and matter—organic solar cells (OSCs) are fully integrated into the world of quantum technologies. However, making significant progress in these various fields depends critically on the properties of the materials used. This is why close collaboration between physicists and chemists is essential to guide research toward the development of optimal materials.
Consequently, the OSCAR project aims to drive major advances in the field of organic microcavities for coherent light sources by fostering a dynamic and collaborative environment that supports both innovative research and the training of young researchers, combining the expertise of chemists and physicists. It will thus focus on three ambitious key challenges:

- Achieving electrical pumping of organic semiconductor lasers,
- Developing low-threshold organic exciton-polariton lasers,
- Exploring new approaches for quantum light sources based on organic semiconductors.

Cet IRN (International Research Network (réseau de recherche international)) a donc le double objectif de structurer la communauté et de former de jeunes chercheurs, car il n'existe actuellement aucun événement régulier permettant de se rencontrer et d'échanger des idées dans ces domaines. Compte tenu des progrès remarquables accomplis ces dernières années, il nous semble donc opportun et utile de regrouper les forces vives autour de problématiques plus spécifiquement dédiées aux sources de lumière organique cohérentes et aux questions liées aux technologies quantiques.

ADDITIONAL INFORMATION

> « Organic Semiconductors in (micro)-Cavities for Advanced Researches (OSCAR) : Beyond OLEDs, designing and harnessing organic light-emitting materials towards quantum technologies »
> Institut Lavoisier de Versailles (CNRS/UVSQ)