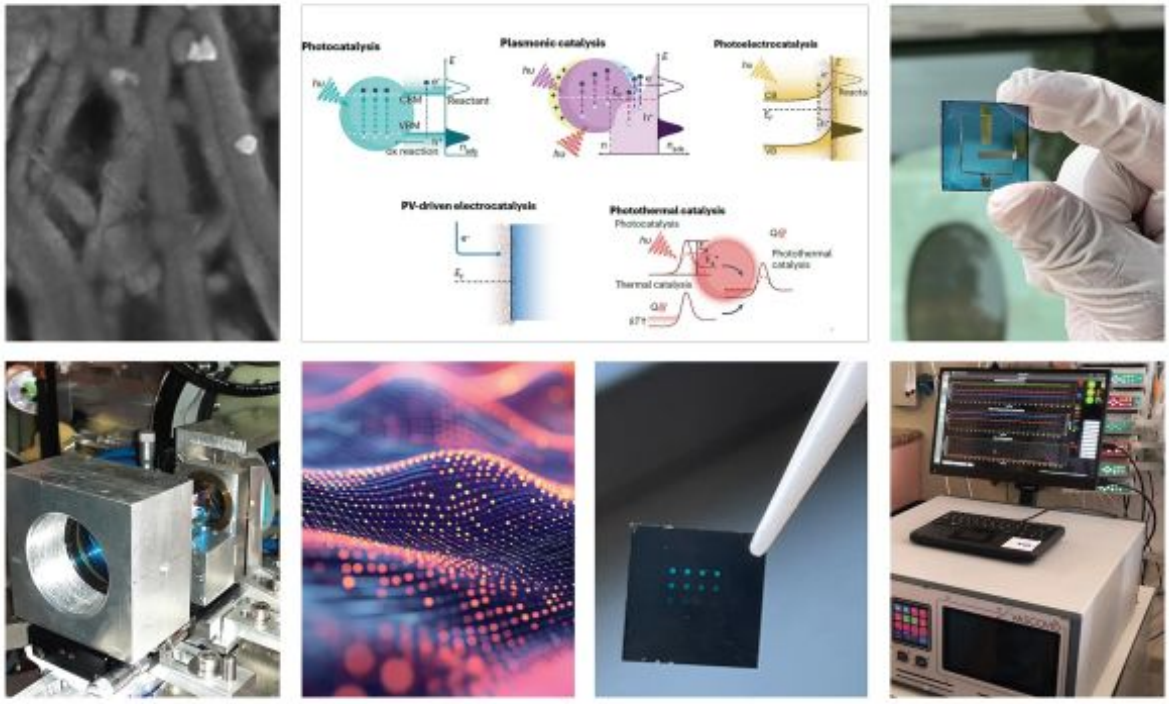

February Science News Recap

ICFO's summary of news highlights of the scientific discoveries and stories from the month of February 2026.

March 05, 2026

February was packed with different scientific discoveries, results and findings that have sparked different stories to share. We've gathered the most important updates to keep you in the know. Whether you missed a few of them or just want a quick recap, our summary of February's top scientific news has you covered. Dive in and catch up on everything that happened this month.

News 1

Controlling light emission improves organic solar cell performance

Organic solar cells (OSCs) use carbon-based materials instead of silicon to convert sunlight into electricity, making them attractive for wearables, smart windows, and building-integrated photovoltaics. But OSCs face a significant efficiency bottleneck due to large losses in open-circuit voltage, the electrical potential difference between the two terminals of solar cells.

The fluorescence quantum yield (FQY), a measure of how efficiently the electrons' extra energy is re-emitted as light rather than lost as heat, affects the organic solar cells' efficiency in terms of open-circuit voltage. Yet, it has remained largely unexplored.
ICFO researchers have now enhanced the performance of an organic solar cell by optimizing the fluorescence quantum yield (FQY). The study, published in ACS Energy Applied Materials, also shows how to improve the FQY by properly engineering the interface between the light-absorbing and the charge-transporting layers, resulting in a measurable increase in the open-circuit voltage.
Date: February 2, 2026
Topic: Solar cells.
ICFO Researchers: Dr. Francisco Bernal-Texca, Chiara Cortese, and Dr. Mariia Kramarenko, led by UPC and ICFO Prof. Jordi Martorell.
Read more ...

News 2:

Mapping the landscape of solar fuel technologies

In the search for more sustainable ways to produce energy and reduce the environmental impact worldwide, solar fuel technologies have emerged as a promising alternative to fossil fuels. By using sunlight to drive chemical reactions, these technologies enable the synthesis of valuable molecules that can be used as fuels and other useful chemicals.
Despite their promise, solar fuel technologies are often studied in isolation, making it difficult to identify shared challenges and common design principles. Now, ICFO researchers have published a perspective article reviewing and comparing five major solar fuel technologies photocatalysis, photovoltaic-driven electrolysis, photoelectrochemical, photothermal, an plasmonic catalysis. In the article, published inNature Reviews Clean Technology, they go over the advantages, limitations, technological maturity, and prospects for real-world deployment of all the methods.
Date: February 3, 2026
Topic: Solar fuel technologies.
ICFO Researchers: Prof. Pelayo Garcia de Arquer, Viktoriia Holovanova, and Diksha Mittal.
Read more...

News 3:

From COVID-19 to critical care: monitoring microvascular health at the bedside

Critically ill patients often struggle to deliver oxygen to the smallest blood vessels. However, early signs of impaired tissue perfusion and oxygenation can remain undetected, even when standard vital signs appear stable, highlighting the need for bedside tools that provide clinically useful information on microvascular function in real-time.
In that context, ICFO researchers designed a practical and robust platform, specifically

tailored for critical patients. In a recent article published in the Journal of Biomedical Optics, the team presented a new multimodal device that integrates time-domain near-infrared NIRS, which offers enhanced depth sensitivity and accuracy compared to conventional devices, with diffuse correlation spectroscopy, which measures microvascular blood flow. The system, which is fully automated and self-contained, allows direct, bedside estimation of baseline tissue oxygen metabolism, without the need for a provocative test.
Date: February 9, 2026
Topic: Medical Optics
ICFO researchers: Marta Zanoletti, Muhammad Atif Yaqub, Lorenzo Cortese, Jacqueline Martinez Garcia, Umut Karadeniz, Marco Pagliazzi, led by ICREA Prof. Turgut Durduran.
Read more...

News 4:
Researchers boost CO? conversion in acidic media by keeping ion traffic under control
One promising strategy to mitigate and eventually reverse greenhouse effects associated with carbon emissions is the capture and electrochemical conversion of CO? into valuable chemicals, for instance via carbon dioxide electroreduction.
ICFO researchers now tackle the challenge of performing this reaction in acidic media by controlling how ions move at the catalyst surface, a fundamentally different approach complementing catalyst design and optimization. The strategy, presented in ACS Energy Letters, improves carbon efficiency, reduces parasitic reactions and maintains stability, all under industrially relevant conditions.
Date: February 12, 2026
Topic: CO2 conversion
ICFO researchers: Blanca Belsa, Dr. Anku Guha, Dr. Barbara Polesso, Ranit Ram, Dr. Viktoria Golovanova, Dr. Marinos Dimitropoulos, Dr. Sunil Kadam, Prathama Haldar, led by ICFO Prof. F. Pelayo Garcia de Arquer.
Read more...

News 5:
A scalable and robust technique for identifying quantum phase transitions
In quantum physics, the ground state is the lowest energy state a system can be in, and it is typically reached at temperatures close to absolute zero. Under these conditions, changing certain external parameters, such as pressure or the magnetic field, can lead to quantum phase transitions, which are driven by quantum fluctuations rather than thermal ones. However, finding the ground state and determining its properties is increasingly challenging for increasingly complex systems. ICFO researchers have now reformulated the ground-state problem to solve it in a way that is both efficient and scalable. This relaxation method has theoretically identified quantum phase transitions in two-dimensional bilayer quantum spin

systems, mapping out their entire phase diagram.
The results, published in Physical Review Letters, establish relaxation methods as robust, scalable and accurate tools for exploring the phase diagrams of complex quantum systems, offering a significant advancement over previous computational techniques.
Date: February 18, 2026
Topic: Quantum physics
ICFO researchers: Dr. David Jansen, Dr. Luke Mortimer, Timothy Heightman, Dr. Andreas Leitherer, and Dr. Pere Mujal, led by ICREA Prof. Antonio Acin.
Read more...

News 6:
Integrating infrared lasers onto silicon for future photonic chips
One of the main challenges faced by Photonic Integrated Chips (PICs) is the integration of infrared light sources onto silicon, the primary material used in photonic chips.
In an Advanced Optical Materials publication, ICFO researchers have demonstrated a way to integrate infrared laser sources directly onto a silicon platform. The method uses solution-processed colloidal quantum dots (CQDs) to emit light of a very specific wavelength , which can be tuned over a broad range (from 1580 to 1680 nanometres).
Moreover, the layer between the silicon substrate and the quantum dot film was patterned periodically. The resulting grating is engineered so that the light exits from the edge of the device, making it much easier to connect to other components on a flat chip.
Date: February 23, 2026
Topic: Photonic chips.
ICFO researchers: Hamed Dehghanpour Baruj, Dr. Guy L. Whitworth, Dr. Nima Taghipour, Dr. Mariona Dalmases, Dr. Debranjan Mandal, led by ICREA Prof. Gerasimos Konstantatos.
Read more...

News 7:
Lattice geometry gives rise to anomalous fluctuations in Bose-Einstein condensates
Fluctuations lie at the core of our universe, from thermal phase transitions to cosmic evolution. One of the most suitable platforms to study them is atomic Bose-Einstein condensates (BECs), where a large number of atoms occupy the lowest-energy state and naturally exhibit intriguing fluctuations.
In a new Physical Review Letters study, ICFO researchers and collaborators have investigated, for the first time, the particle-number fluctuations in a BEC placed in a triangular optical lattice. The team has observed strongly anomalous fluctuations in the condensate's number of atoms, while also revealing that the confinement in a lattice deeply influences such fluctuations. This brings us one step closer to reveal new quantum many-body phenomena in lattice systems and, in the long-term, could enable applications in

quantum metrology.

Date: February 25, 2026

Topic: Quantum physics

ICFO researchers: Dr. Zahra Jalali-Mola and Dr. Utso Bhattacharya, led by ICREA Prof. Maciej Lewenstein.

Read more...