SCIENCE FLASH NEWS

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Review covers optical aspects of quantitative photoacoustic tomography

Quantitative photoacoustic tomography (QPAT) is a medical imaging technique that combines laser-induced photoacoustic signals and ultrasound detection to create detailed three-dimensional images of biological tissues. The process involves irradiating biological tissues with short laser pulses. These pulses are absorbed by light-absorbing molecules (chromophores) within the tissues, leading to rapid heating and the generation of ultrasonic waves or acoustic signals. In a review published in the Journal of Biomedical Optics (JBO), Tanja Tarvainen from the University of Eastern Finland and Ben Cox from University College London discuss the optical part or image generation aspect of QPAT.

https://phys.org/news/2024-01-optical-aspects-quantitative-photoacoustic-tomography.html

Artificial intelligence helped scientists create a new type of battery

A new battery material has been discovered by combining two computing superpowers: artificial intelligence and supercomputing. It's a discovery that highlights the potential for using computers to help scientists discover materials suited to specific needs, from batteries to carbon capture technologies to catalysts. Calculations winnowed down more than 32 million candidate materials to just 23 promising options...

https://www.sciencenews.org/article/artificial-intelligence-new-battery

Towards the quantum of sound

The quantum ground state of an acoustic wave of a certain frequency can be reached by completely cooling the system. In this way, the number of quantum particles, the so-called acoustic phonons, which cause disturbance to quantum measurements, can be reduced to almost zero and the gap between classical and quantum mechanics bridged...

https://www.sciencedaily.com/releases/2024/01/240118150744.htm

Researchers observe the wave-particle duality of two photons

Understanding the nature of quantum objects' behaviors is the premise for a reasonable description of the quantum world. Depending on whether the interference can be produced or not, the quantum object is endowed with dual features of a wave and a particle, i.e., the so-called wave-particle duality (WPD), which are generally observed in the so-called mutually exclusive experimental arrangements in the sense of Bohr's complementarity principle...

https://phys.org/news/2024-01-particle-duality-photons.html

1st evidence of nuclear fission in stars hints at elements 'never produced on Earth'

The finding suggests that nature may forge elements with atomic masses greater than 260 — heavier than even those at the edge of the periodic table — before breaking them down again. While simulations of stellar evolution have suggested that this heavy-duty fission is likely to happen, the new research marks the first "direct evidence" of the process...

https://www.livescience.com/space/cosmology/1st-evidence-of-nuclear-fission-in-stars-hints-at-elements-never-produced-on-earth

Physicists Capture Direct Images of Noble Gas Nanoclusters at Room Temperature

Physicists have, for the first time, directly imaged small clusters of noble gas atoms at room temperature. This achievement opens up exciting possibilities for fundamental research in condensed matter physics and applications in quantum information technology...

https://www.sci.news/physics/noble-gas-nanoclusters-12603.html

Generating stable qubits at room temperature

A group of researchers reports that they have achieved quantum coherence at room temperature, which is the ability of a quantum system to maintain a well-defined state over time without getting affected by surrounding disturbances This breakthrough was made possible by embedding a chromophore, a dye molecule that absorbs light and emits color, in a metal-organic framework, or MOF, a nanoporous crystalline material composed of metal ions and organic ligands. The research is published in the journal Science Advances...

https://phys.org/news/2024-01-generating-stable-qubits-room-temperature.html

Thank you

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