

Best of Last Week—Barkhausen noise detected, LLMs use simple mechanisms, link between exercise and insomnia

April 1 2024, by Bob Yirka

Credit: AI-generated image

It was a good week for physics research, as a combined team from Columbia, Nanjing University, Princeton and the University of Munster found the first experimental evidence for a [graviton-like particle](#) in a quantum material—they reported collective excitations with spin chiral graviton modes in a semiconducting material. Also, a team of physicists at California Institute of Technology detected [Barkhausen noise](#) for the first time. The magnetic avalanche was triggered by quantum effects. And a team of researchers at the University of Waterloo's Institute for Quantum Computing announced that the world is one step closer to [secure quantum communication](#) on a global scale. They made the claim after finding a way to produce nearly perfect entangled photon pairs from quantum dot sources.

In technology news, a team with members from MIT, Northeastern University and Technion IIT found that LLMs use a [surprisingly simple mechanism](#) to retrieve some stored knowledge, such as linear functions with as few as two variables and no exponents. And a team at University College London developed a fabrication process that allows for ["near perfect" control](#) of single atoms, a major advance toward quantum computing. Also, an international team of researchers successfully [transformed CO₂ into methanol](#) by shining sunlight onto single atoms of copper deposited on a light-activated material, a discovery that could pave the way for creating new types of green fuels. And a team of engineers at Daegu Gyeongbuk Institute of Science and Technology and Samsung developed a way to [increase the efficiency](#) of eco-friendly solar cells by converting wind energy into high-voltage electricity.

In other news, a combined effort from researchers at the Natural History Museum of Los Angeles County and pharmaceutical giant AstraZeneca

resulted in the discovery of the first-ever [mineral-based treatment](#) for widespread disease using the structure of crystals. They used the crystals to successfully treat patients with hyperkalemia. Also, a team at Trinity College Dublin unlocked genetic secrets from [4,000-year-old teeth](#), which illuminated the impact of changing human diets over the centuries. And finally, an international team of medical researchers found evidence of [a link](#) between consistently exercising two to three times a week over the long term and reduced insomnia risk.

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