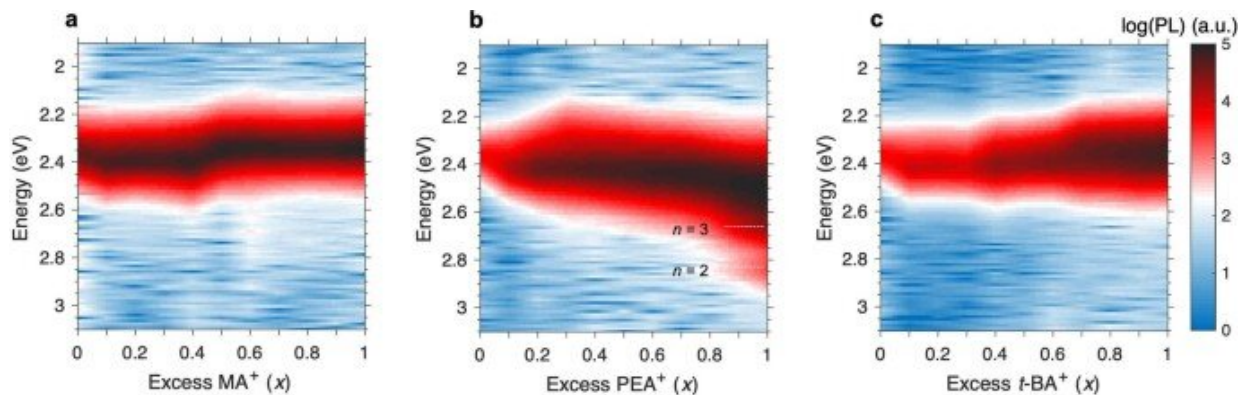


Lights could be the future of the internet and data transmission

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Photoluminescence properties of the perovskite films. Credit: *Nature Photonics* (2023). DOI: 10.1038/s41566-023-01242-9

Fast data transmissions could be delivered in homes and offices through light-emitting diodes (LED) bulbs, complementing existing communication technologies and networks.

The future's new internet technologies are being rapidly refined by academics and LED-based communication links are expected to be extensively used in numerous emerging services and scenarios, including Light-fidelity (Li-Fi), underwater communications, moderate- to high-speed photonic interconnects and various "Internet of Things" (IoT) devices.

A new study, published in *Nature Photonics* and led by the University of Surrey and University of Cambridge, has investigated how to release high-speed photonic sources using [metal-halide perovskites](#). These are semiconductors being researched with LEDs for their excellent optoelectronic properties and low-cost processing methods.

Dr. Wei Zhang, lead corresponding author of the study and associate professor at University of Surrey's Advanced Technology Institute, said, "Billions of IoT connected devices have the potential to add significant value to industry and the global economy. In this market costs and compatibility are often prioritized over data transmission speed and scientists are looking for alternative ways to reduce [energy consumption](#) per bit and improve compactness while simultaneously working on improving the speed of data connection."

"In our study we have made a huge leap forward and shown how metal-halide perovskites could provide a cost-efficient and powerful solution to make LEDs which have [enormous potential](#) to increase their bandwidths into the gigahertz levels. The insights gained from this research will undoubtedly shape the future of data communication."

"Moreover, our investigations will accelerate the development of high-speed perovskite photodetectors and continuous wave pumped perovskite lasers, thus opening up new avenues for advancements in optoelectronic technologies."

Hao Wang, co-first author and Ph.D. student at the University of Cambridge, said, "We provided the first study to elucidate the mechanisms behind achieving high-speed perovskite LEDs, which represents a significant step toward the realization of perovskite light sources for next-generation data communications. The ability to achieve solution-processed perovskite emitters on silicon substrates also paves the way for their integration with micro-electronics platforms,

presenting new opportunities for seamless integration and advancement in the field of data communications."

More information: Aobo Ren et al, High-bandwidth perovskite photonic sources on silicon, *Nature Photonics* (2023). [DOI: 10.1038/s41566-023-01242-9](https://doi.org/10.1038/s41566-023-01242-9)

Provided by University of Surrey

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