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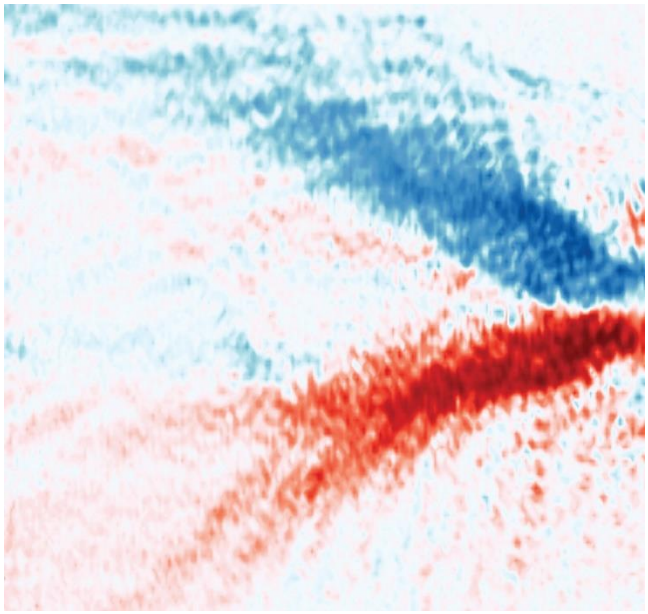
NTU scientists achieve breakthrough in high-speed data processing with room-temperature polaritons



SINGAPORE: Researchers at Nanyang Technological University (NTU) have achieved a groundbreaking advancement in the field of computing and data processing by successfully manipulating polaritons—hybrid particles that exhibit both light and matter characteristics—at room temperature. This innovation paves the way for ultra-fast computing technologies.

Polaritons are unique particles with a property known as “spin,” akin to rotational movement either clockwise or anti-clockwise. This spin serves as a mechanism for encoding computer data, and altering the spin or motion of polaritons effectively modifies the data they store.

However, until now, such manipulations were only feasible at extremely low temperatures, akin to the frigid conditions of outer space. This requirement made practical applications costly and logistically challenging.

The NTU study, co-led by Assistant Professor Su Rui of the School of Physical and Mathematical Sciences (SPMS) and School of Electrical and Electronic Engineering,

alongside Associate Professor Timothy Liew from SPMS, demonstrates for the first time that polaritons can be manipulated at room temperature.

The researchers achieved this feat by using a green laser to generate polaritons in a specialized material, caesium lead bromide, combined with a layer of liquid crystal molecules in a microcavity structure. By applying an external voltage, they controlled the spin and movement of the polaritons, enabling them to act as carriers of data.

This manipulation technique allows polaritons to store, transfer, or process information at speeds far exceeding current computing capabilities, as polaritons travel at the speed of light.

The ability to work with these particles at room temperature could revolutionize data processing, offering faster and more energy-efficient solutions compared to existing technologies.

The discovery holds promise for next-generation computing and data systems, potentially transforming industries reliant on high-speed data transfer and processing.

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