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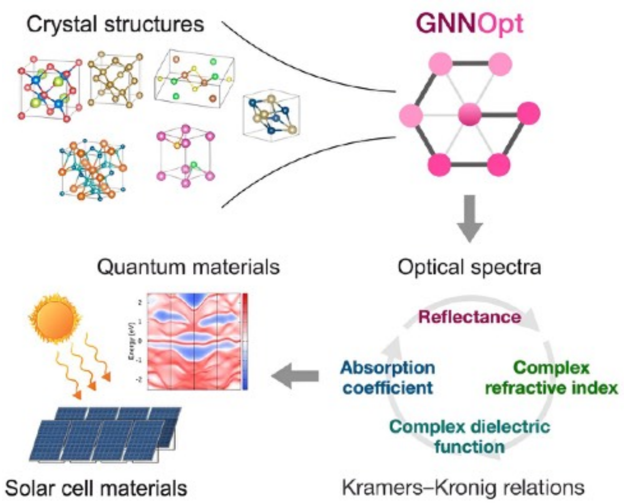
AI PREDICTS OPTICAL PROPERTIES TO SPEED UP THE DISCOVERY OF ENERGY AND QUANTUM MATERIALS



Source: phys.org

IBM Quantum Researchers from Tohoku University and MIT have developed a new AI tool that can predict optical properties of materials with quantum simulation accuracy but a million times faster. This breakthrough could accelerate the development of photovoltaic and quantum materials. The AI model uses only a material's crystal structure as input to predict optical properties across a wide range of light frequencies.

The team, led by Nguyen Tuan Hung and Mingda Li, introduced a universal ensemble embedding method that improves prediction accuracy without affecting neural network structures. This method can be integrated into any machine learning architecture, potentially impacting data science significantly.

The new AI tool could revolutionize the screening of materials for high-performance solar cells and the detection of quantum materials. The researchers plan to expand their work by developing new databases for various material properties to enhance the AI model's predictive capabilities.

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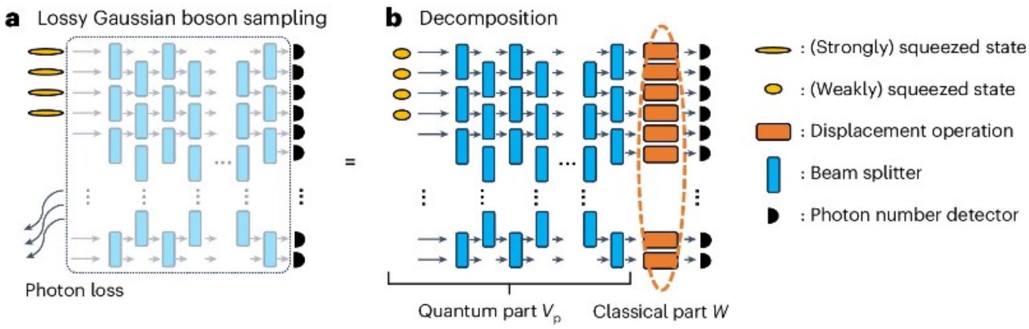
NEW CLASSICAL ALGORITHM ENHANCES UNDERSTANDING OF QUANTUM COMPUTING'S FUTURE



Source: nature physics

Researchers from the University of Chicago and Argonne National Laboratory have developed a classical algorithm that simulates Gaussian boson sampling (GBS) experiments, a significant advancement in quantum computing. GBS has been considered a promising approach to demonstrating quantum advantage, but the presence of noise in actual experiments has complicated the assessment of quantum superiority. The new algorithm addresses these complexities by leveraging high photon loss rates common in current GBS experiments, providing a more efficient and accurate simulation. Remarkably, the classical simulation outperformed some state-of-the-art GBS experiments in various benchmarks, raising questions about the claimed quantum advantage of existing experiments.

This breakthrough has implications beyond quantum computing, potentially impacting fields such as cryptography, materials science, and drug discovery. The research emphasizes the importance of understanding how noise affects quantum system performance and highlights the need for continued advancement in both quantum and classical computing.The study is part of a series of research efforts by the team, building on previous work examining the computational power of noisy intermediate-scale quantum devices and exploring the impact of noise on quantum supremacy experiments. This development serves as a bridge toward more powerful quantum technologies and aids in navigating the complexities of modern challenges.

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