AI at the Atomic Scale: Revolutionizing Nanoscience from Discovery to Manufacturing

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Abstract

This work is about the role of Artificial intelligence (AI) in advancing Nanotechnology. AI is transforming nanoscience and nanotechnology by enabling data-driven material discovery [1], precise nanofabrication, and automated characterization. Machine learning models accelerate the design of quantum dots, 2D materials, and plasmonic nanostructures, while deep learning enhances atomic-scale microscopy analysis [2]. AI also optimizes nanomanufacturing processes, from self-assembly to lithography, and advances applications in nanomedicine and quantum devices. Despite challenges like limited datasets and model interpretability, integrating AI with automated labs [3] and quantum computing promises to revolutionize nanoscale research and innovation.

References

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