The Role of Quantum Dots in Modern Photonic Devices

Quantum dots (QDs) are semiconductor nanocrystals that exhibit quantum mechanical properties, making them highly relevant in modern photonic applications. Their size-tunable emission and high brightness have enabled breakthroughs in displays, solar cells, and biomedical imaging.  
Recent studies have shown that QDs enhance light absorption in solar panels and improve color accuracy in LED displays. Moreover, their biocompatibility and photostability make them ideal for targeted drug delivery and diagnostics.  
Despite their advantages, challenges such as toxicity and manufacturing scalability remain. Ongoing research aims to address these limitations, paving the way for widespread adoption in commercial and medical technologies.