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(57) Abstract :

The present invention relates to a digital holographic nanoscopy (DHN) system (100) for the magnification and qualitative and quantitative optical analysis of biological cells, nanoparticles, and quantum dots. By aligning two Microscope Objective (MO1, MO2) lenses in the path of the object beam (O) and one MO (MO3) in the path of reference beam (R) of the DHN, the proposed system can detect a quantum dot with a minimum size of 6.8 nanometers with a magnification of 1,53,284? with very high axial and lateral resolution. A digital hologram of the specimen being captured through different combinations of MOs deployed at varied distances from one another. It can characterize the nearly transparent objects from micron to the nanometer scale via controlling its magnification to accommodate the requirements. The data are presented for human erythrocytes (red blood cells) with an average diameter and thickness of 7.17 μm and 2.3 μm , respectively, and various-sized (50 nm-6.8 nm) gold nanoparticles (AuNPs).

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