



3D Imaging of a Phase Object from a Single Sample Orientation Using an Optical Laser

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Ankylography is a new 3D imaging technique, which, under certain circumstances, enables reconstruction of a 3D object from a single sample orientation. Here, we provide a matrix rank analysis to explain the principle of ankylography. We then present an ankylography experiment on a microscale phase object using an optical laser. Coherent diffraction patterns are acquired from the phase object using a planar CCD detector and are projected onto a spherical shell. The 3D structure of the object is directly reconstructed from the spherical diffraction pattern. This work may potentially open the door to a new method for 3D imaging of phase objects in the visible light region. Finally, the extension of ankylography to more complicated and larger objects is suggested.

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