## Enhanced Acquisition Time of a Quantum Holography Scheme within a Nonlinear Interferometer

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**Abstract :** The work proposes a technique that decreases the detection acquisition time of quantum holography schemes down to one-third; this allows the possibility to image moving objects. Since its invention, quantum holography with undetected photon schemes has gained interest in the scientific community. This is mainly due to its ability to tailor the detected wavelengths according to the needs of the scheme implementation. Yet this wavelength flexibility grants the scheme a wide range of possible applications; an important matter was yet to be addressed. Since the scheme uses digital phase-shifting techniques to retrieve the information of the object out of the interference pattern, it is necessary to acquire a set of at least four images of the interference pattern along with well-defined phase steps to recover the full object information. Hence, the imaging method requires larger acquisition times to produce well-resolved images. As a consequence, the measurement of moving objects remains out of the reach of the imaging scheme. This work presents the use and implementation of a spatial light modulator along with a digital holographic technique called quasi-parallel phase-shifting. This technique uses the spatial light modulator to build a structured phase image consisting of a chessboard pattern containing the different phase steps for digitally calculating the object information. Depending on the reduction in the number of needed frames, the acquisition time reduces by a significant factor. This technique opens the door to the implementation of the scheme for moving objects. In particular, the application of this scheme in imaging alive specimens comes one step closer.

Keywords : quasi-parallel phase shifting, quantum imaging, quantum holography, quantum metrology

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