

Polarization Modulation to Increase the Density of Holographic Data Storage

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In traditional holography, because the intensity distribution of two interference waves in which include amplitude and phase is recorded, only the same components of polarization state of two interference waves are considered. The actual polarization states of two interference waves are ignored. In polarization holography, not only amplitude and phase of two waves but also the polarization states of two waves, are recorded. As the reason, polarization holography is expected to have more abundant characteristics of reconstruction and a wide range of applications, such as holographic storage technology, multichannel polarization multiplexing, vector beams, and optical functional devices.

The tensor theory of polarization holography, in which the response of recording material to the polarized wave is treated as a tensor, the research of polarized holography has become hot, and has made a lot of new progress. The conditions of the null reconstruction, there is not reconstruction even Bragg condition is satisfied. Another important research target is the condition of faithful reconstruction, in which the polarization state of the reconstructed wave is kept the same as that of the recording wave. In the tensor theory, the condition of faithful reconstruction is that some balance has to be satisfied in the case of linear, circular and elliptical polarization holography.

Linear polarization is the essential state, and any complex polarized state can be combined by linearly polarized state. Polarization holography for high density storage. In this review, the characteristic and behave of linear polarization holography have been introduced. An applications to increase the density of holographic data storage by polarization modulated method is also introduced.

Short biography:



Xiaodi Tan, graduated from the Optical Department of Shandong University in 1984, he obtained Master's Degree from the Optical Engineering Department of the Beijing Institute of Technology in 1990. His Doctoral thesis was completed at The University of Tokyo, Institute of Industrial Science in 2001. He was a Senior Engineer of the Technology Division in OPTWARE Corporation, researching and developing the next generation of optical data storage systems. And he was a Senior Technology Analyst, Distinguished Engineer and Optical Technology Manager of Core Device Development Group in Sony Corporation. During 2012 to 2017, he was a professor at the School of Optoelectronics in Beijing Institute of Technology. He is currently a professor at the College of Photonic & Electric Engineering in Fujian Normal University. His research interests are in information optics & photonics: holographic storage, optical information display, optical devices, etc.