Tohoku Univ./NHK Technology

High-Resolution Liquid Crystal Spatial Light Modulators for Electronic Holography

Realizing wide viewing-zone angles For electronic-holography 3D displays

Overview

- Electronic holography for displaying three-dimensional (3D) information is required for entertainment, industrial design, measurement, and head-up display for automobiles.
- 3D information is displayed by reconstructing an image through a spatial light modulator(SLM). **Conventional SLM cannot narrow the pixel pitch** because **the electric field leaks out to adjacent pixels**, **resulting in a narrow viewing-zone angles.**
- Therefore, the invention introduces a liquid crystal driving system in a **lateral electric field by a continuous potential difference** and fine **ground electrodes** into the SLM.
- As a result, the electric field leakage is reduced, **the pixel pitch of less than 1 μm is achieved** for the first time.
- Using the pixel pitch of 1μm, it is possible to **achieve practical viewing-zone angels of 30°**.The invention is expected to enlarge electronic holography application field.

Product Application

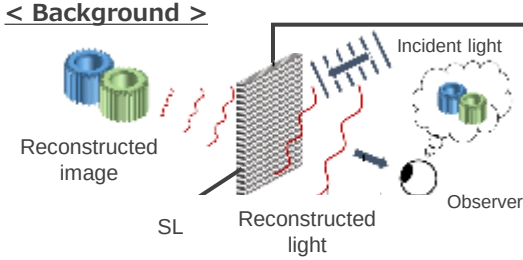
- SLM for electronic holography

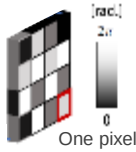
IP Data

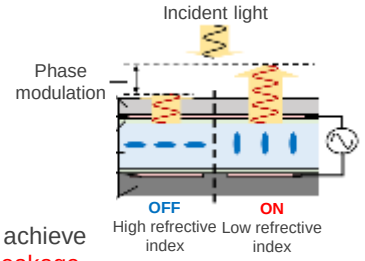
IP number : Not published
Inventors : FUJIKAKE Hideo, TOCHIGI Hiroto, NAKATANI Masakazu
Admin No. : T23-075

Features･Outstandings

< Background >



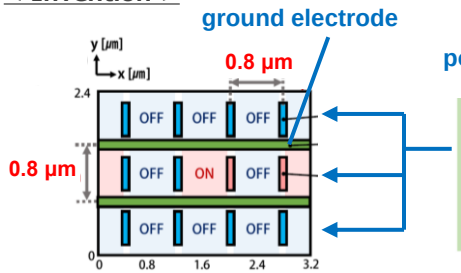




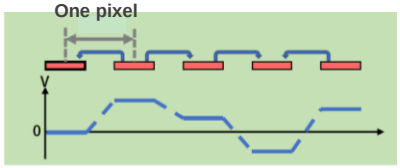
Conventional system (vertical electric field)

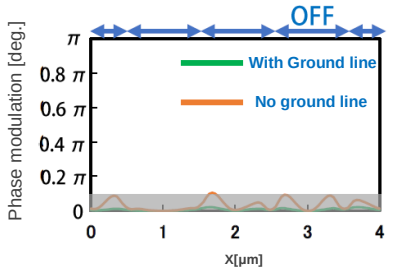
- SLM consists of small liquid crystal pixels.
- It was difficult for vertical electric field system to achieve wide viewing-zone angles due to electric fields leakage.

< Invention >

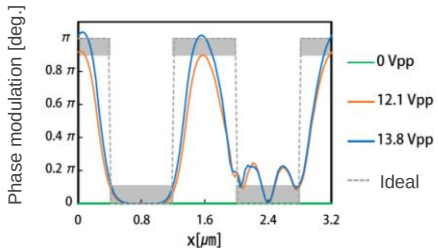


Applying electric field **by continuous potential difference in lateral direction**





Phase distribution of OFF pixels.



Phase distribution of ON/OFF pixels

Independent driving was possible with pixel pitch of 0.8 μm according to liquid crystal alignment simulation.

=> Expect to wide viewing-zone angle of electronic holography!

Contact

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