HODIS (HOXEL DISPLAYER)
DEMONSTRATION OF PERFECT HOLOGRAPHIC DISPLAY BY COMMERCIAL 4K PLANE DISPLAYER

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Introduction

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“Four Dimensional Fourier Transform and Reinvention of Holography”

real-time holographic display by simple aggregation of digital camera-projector array combined with a holographic functional screen
Real-time Display System

Selfmade Functional Screen
Screen Size: 1.3m by 1.8m
Real-time Display
Video for Digital Files by Geola
Hoxel & Spectrum

\[ I(r_{jk}) = f * f = |f(r_{jk})|^2 \]  \hspace{1cm} (1)

\[ f(r_{jk}) = \sum \sum F(k_{mn}) \exp(j2\pi(-k_{mn} \cdot r_{jk})) \]  \hspace{1cm} (2)

\[ I(k_{mn}) = F * F = |F(k_{mn})|^2 \]  \hspace{1cm} (3)

\[ F(k_{mn}) = \sum \sum f(r_{jk}) \exp[-j2\pi(-k_{mn} \cdot r_{jk})] \]  \hspace{1cm} (4)
Holographic Sampling & Display
Optimum Aperture Size

$$\Phi_{opt} = \frac{2 \lambda_{jk}}{\omega_{jk}} = \frac{2 \lambda}{a \Delta_{jk}}$$
Parallel acquisition of spectrum
Holographic coding of spectrum

<table>
<thead>
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<th>S_{jk}</th>
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<tbody>
<tr>
<td>M</td>
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<td>1</td>
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<td>N</td>
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Recovering of discrete spectrum
Important Condition

\[ \omega_{mn} = \frac{d_1}{l_1} = \frac{d_2}{l_2} \]
4K Hodi Parameters

Signal source: 4K plane display
Lens number: 3818 in honeycomb array
Lens size: 10mm diameter
1. Hoxel size is 2.5mm*2.5mm,
2. Number of hoxels is J*K=337*188,
3. Number of spectrum is M*N=36*36,
4. Viewing angle is Ω=30°
Holographic coded pattern of the spectrum inside each small lens
Restoring without HFS
Pictures taken from multi directions of the displayed digital 3D model
Pictures taken from “skull” holodisplay
Conclusions

Although available 4K display could only get 2.5mm hoxel size, the developing 8K even 16K display would eventually improve the final hoxel resolution to the eyecatching level, it seems if only the lens aperture is bigger than human pupils.