

“A memory of a stone”

Hologram created with pulse laser

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Abstract

Hologram image is so realistic that various images can be displayed at stereoscopic image in three dimensional space even though they are illusion. The main subject of this paper is to express the meaning of our existence using the hologram image. We succeeded to present the memory of human life such as feeling of happiness, brightness and silence of our life by a series of hologram works of “A memory of a Stone” using the pulse laser holographic image and made clear the efficiency of this method. A stone named “Sand Rose” is the symbol of our self-existence.

Keyword

hologram, 3D-display, stereoscopic image, pulse laser, Sand Rose, self-existence

“ある石の記憶” パルスレーザーによるホログラム

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要旨：

ホログラムの立体像は大変リアルであるために虚像の三次元空間に様々なイメージをふくらませることができる。本論文の主題は私たちの存在の意味をホログラムを用いて表現することです。なぜなら現実の存在をホログラムの虚像を用いて表現できると考えたからです。私たちは、パルスレーザーを用いて作製した一連のホログラム作品“石の思い出”を用いて 幸福、輝き、平穏など人の一生を表現することができ、その有効性を明らかにできました。そこで“砂漠の薔薇”と呼ばれる石は我々の存在そのものを意味しています。

キーワード：ホログラム、3Dディスプレイ、立体像、パルスレーザー、砂漠の薔薇、存在

1. Introduction

Holography is invented by Dennis Gabor in 1947. It is a technique to record intensity and phase of the reflected light from three-dimensional (3D) object by interference of light on the photographic film and it can reconstruct 3D image. Hologram technique has been improved so much. The application of the hologram extends to many fields such as 3D display, optical memory, optical measurement, hologram printing, security of card and bill. 3D display became prominent application, because real 3D image can be obtained by holographic method. It can express brightness, color and contrast like photographic image but as it can express depth of the 3D object at 3D space¹⁻³). Image reality of hologram is much better than other 3D image. Holographic 3D image has been used to mainly reappear the original 3D images such as portrait, medical imaging, because hologram image is actually a map of 3D object. but it is so real that it has been considered to be used for artistic field.

2. Holography art works

Hologram image actually map of 3D object, but 3D image is so realistic that it is felt real one even though it is illusion. In 1968 Margaret Benyon⁴) first started holography art works in London. Since then hologram was used for art works⁴). There are many remarkable holography art works. The works of Rudie Berkhout⁴) are extension of light to the space. Recently we are deeply impressed by following holography art works. “Thera” and “Fossil” by Ikuo Nakamura⁵) and “Water Dream” by Ana Maria Nicholson⁶) are very dynamic because they are collaboration of hologram with video image. “Spinning Threads of Light” by Setsuko Ishii.⁷⁻⁸) is very beautiful by crossing light and her other work

“Murmur of Aquas” is very comfortable by installation with water. “Pray” by Yumiko Shiozaki⁹) is reconstructed by candle and impression of the image is very quiet.

The works of Toshihiro Kubota¹⁰) “Japanese Doll” is very realistic. These works gave me much inspiration for us and we demonstrated holography art work “A grave of a stone” related to this paper to Nicograph International 2005¹¹).

3. The main subject

I always think that existence is mysterious and sometimes I think my existence is also illusion. I find the mystery of existence and it is the common feature of the hologram. Hologram is actually a map of 3D object to the image but the 3D image seems to be real existence completely. Thus, the hologram not only stimulates the image but also stimulates the existence. A hologram enables the object will be existing even if the object doesn't exist.

The main subject of this paper is to present the meaning of our existence using the hologram image, because we think hologram can clearly express the existence of our life.

The concept of the work of this paper “A memory of the stone” means that a stone named “Sand-Rose” is the symbol of our existence. We try to express memorial moment of our life that is the feeling of expectation, brightness and silence etc by pulse laser hologram image. It means that I think real world can be express by holographic illusion.

4. Experimental method

Fig.1 shows an optical system for making master hologram. Fig.2 shows an optical system for making image hologram. Pulse laser is used for making hologram.

Pulse laser is very useful to take hologram of

moving object such as flowing water, moving sand because the pulse width is very short and

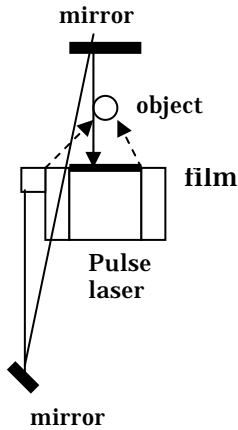
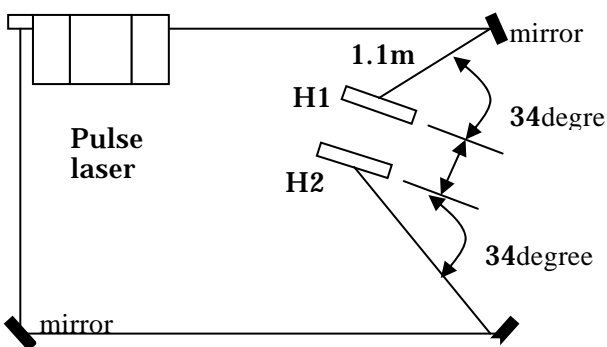


Fig. 1 Master hologram

one pulse intensity is very strong. In fig.1 the reference light and the object light enter at the angle of 34° . Master hologram is illuminated at the angle of 34° in fig.2. We can get image hologram. We can observe the image of hologram (H_2) by incoherent reflected light coming from the upper direction.



H1: Master Hologram
H2: Image Hologram

Fig. 2 Image hologram

We used pulse laser for making hologram because power of pulse laser is so strong and pulse length is so short that we can make

hologram of moving object. In this paper pulse laser is very useful when we use falling sand to image the desert and also use drops of water to purify the stone.

5. Results and discussion

We tried to present the memory of human life such as the feeling of happiness, brightness and silence of our life by a series of hologram works of "A memory of a stones " using pulse laser holographic image.

Hologram art work shown in fig.4 is named "The beginning of the desert" A stone was used for express the symbol of this art work. Falling sand from upper direction means the beginning of the desert . We express the stone is being born from the desert. Our image of the stone is silent and peaceful on the desert. In this hologram the stone is named "Sand Rose"



Fig. 3 The beginning of the desert

Fig.4 is named "A brilliance of a stone ". We used a lot of broken mirror under the stone. This hologram is composed of two holograms. They are the same image, but one hologram is chemically processed and color of the image is different. One of them is red, the other is blue.

We put them together and reconstruct the image. The image of the broken glass scatters the light to get multi-color image. The reconstructed image shows very bright and good quality. We express a lot of memory by a lot of broken mirror and the stone “Sand Rose” is shining brightly.



Fig. 4 A brilliance of a stone

Hologram art work shown in fig.5 is named “creeping”. The theme of this hologram is expectation and anxiety. Everything is covered with cloth and it is being cut just now by a scissors. Something is being appear and at same time dark shadow of the scissors means the feeling of anxiety.



Fig.5 creeping

Fig.6 is the object of a hologram named “ A grave of a stone ” , The folding screen, the petal and the glass were put together and the stone “Sand-Rose” and the petal were put in the glass and drops of water were falling on the stone quietly.



Fig. 6 Object of “a grave of a stone”

Fig.7 is the reconstructed image from the hologram. The image of the stone, glass and the drops of water are clearly reconstructed from the hologram as shown in fig.7.

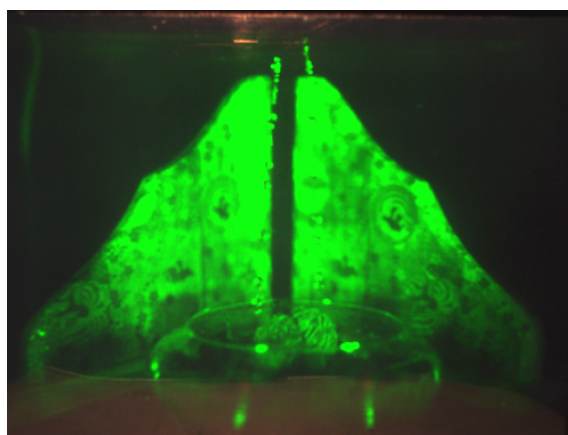


Fig.7 A grave of a stone

The image of the hologram is observed clearly without losing the feeling of quality as for the glass, the stone, and water. The stone is not self-insisted and exists certainly there. We express the stone is sleeping forever peacefully. This hologram expresses "Silence" and "Stillness". The stone is a symbol of existence for us and the hologram is the illusion for us, so the stone is special existence for us. We think that a person and the stone might be a similar existence. Therefore, we compared the stone to the person and so it can be said that these holograms express person's life.

6 . Conclusions

In this paper, we discussed the artistic aspect of the hologram as the map of the object created with the pulse laser.

We tried to express the idea of concept of our existence by "A memory of the stone". A artistic features "the stones" is the symbol of our existence and we are very satisfied that we could express the feeling of expectation, brightness and silence in these holographic art works.

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