全像技術點構成原理應用於星座投影之研究

研究生：賴奕佑　指導老師：黃雅玲
崑山科技大學視覺傳達設計研究所

摘　要

隨著生活知識水準的提高，自然天文教育成為我們生活的一部分，雖然多元環境下充滿著許多相關的資訊，在整體趨勢的引領下，全像投影技術在近年來已被廣泛運用，例如天文館中的星空投影機，帶給人們虛擬真實的體驗感，隨著媒體應用的卓越發展，全像也應用在輔助國小天文學習課程上。

本研究透過全像立體影像技術探討星座投影之影像變化。從三項實驗與訪談法來探討材質、明度、深度這三方面的關聯性，分別以穿透式、反射式作為實驗方法。透過全像立體影像投影可改善空間展演方式，並強調圖像的銳利度與立體感，予以建立雷射全像投影之規則，實驗所得之結論歸納下列幾點：

（1）從投影的影像結果得知，各類別材質都有不同的影像差異，其中以保麗龍球為最佳，此材質亮度及完整性足夠。

（2）從星等概念帶入全像立體星座投影的設計，在雷射光配合全像片的投影下，其影像表現清晰明亮且銳利。

（3）在反射式全像媒材方面，透過鹵素燈的照射較能突顯星體的立體感並提高影像的辨識度。

（4）從實驗訪談方面，認為全像立體影像的教材開發能輔助現有的教學，因此，透過全像的學習與學校的星象教科書整合發展是未來能夠落實的方向。

關鍵詞：點構成、星等、星座圖像、雷射全像立體影像

A Study of Holographic Point Construction Applied on the Astronomical Projection

Graduate student: Lai, Yi-Yu Adviser: Huang, Ya-Ling
Graduate School of Visual Communication Design,
Kun Shan University

Abstract

With the improvement of living level and knowledge, astronomical education has become a part of our life. The holographic projection technology in recent years has been widely used in the overall trend. For example, the astronomical projector used in the Planetarium bring a sense of virtual reality experience for people, and with the outstanding development of media application, holography is also applied in supporting the astronomical courses in the elementary school.

This study explores the variation of the constellation projection image through 3D holographic technology, and explores the relation between material, brightness, and depth via three experiments and interviews. The holographic projection could improve the spatial display; moreover, the sharpness and stereo effect are emphasized in holography. The study aims to build the standard of holographic projection. The conclusions of the experiments are shown below:

(1) Different materials in each categories shows different projected image effect. Styrofoam ball is the best one, which is bright and complete in shape.
(2) When combining the concept of magnitude with the design of holographic astronomical image, the projected image is clear and sharp while using laser light to project the holographic image.
(3) In the part of reflection holography, the stereo effect of the stars would be highlighted through the illumination of halogen lamp, and the recognition of the image is also improved.
(4) In the part of the interview, the expert states that the development of holographic teaching materials could support existing materials. Therefore, the integration of the holography and the astronomical teaching materials is the direction which could progress in the future.

Keyword：Point Construction, Magnitude, Astronomical Pattern, Holography