

國立交通大學
光電工程研究所
碩士論文

光纖透鏡與固態浸沒透鏡之積體化讀取頭
整合分析

**Tolerance Analyses of Planar Pickups with
FiberLens and SIL**



研究生：李其致

指導教授：謝漢萍 教授

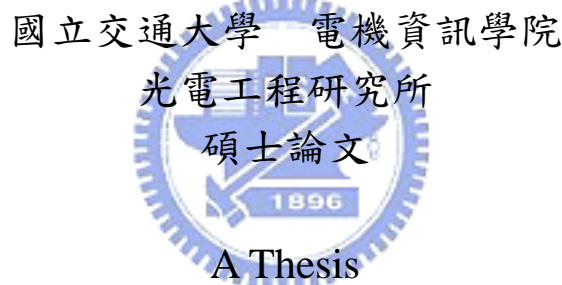
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中文摘要

光纖透鏡讀寫頭有兩個優點。第一，大幅減少重量，可使搜尋時間減小。另一個優點為：易於與其他元件整合。然而光纖透鏡的限制在於光點過大和數值孔徑過小，所以我們嘗試增加固態浸沒透鏡來加強數值孔徑和減小光點，本論文即在分析整合光纖透鏡與固態浸沒透鏡之光學特性與系統容許度，並進行量測驗證。

第一部份為設計在整合光纖透鏡和固態浸沒透鏡，並分析製作和組裝誤差並算出這系統的容忍度和光學特性之影響。第二部份為說明製作的程序和架設量測系統，以得知光纖透鏡的效率和光纖透鏡加上固態浸沒透鏡效率，而得以驗證模擬和分析誤差原因。

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Abstract

The fiber-based optical pickup has two advantages. The large reduction in weight of the moving part allows higher speed operation. Another advantage is that an optical isolator can be easily inserted between the LD and the fiber to stabilize the lasing. The limitation of fiber-base pickup head is that NA is too small, thus, large spot size. The solid immersion lens (SIL) is added into the planar fiber-base pickup head for increasing NA. The objective of thesis is to design the system, analyze the tolerance in fabrication and assembly process, and demonstrate the feasibility of integrating fiber-base pick-up head.

The first part of thesis is to design the system, analyze the tolerance in fabrication and assembly process. The second part is to describe the fabrication process and set up the measurement system. According to the measurement system, the performances of fiberlens and fiberlens plus SIL were measured. From these results, the differences between measurement and simulation were analyzed.