

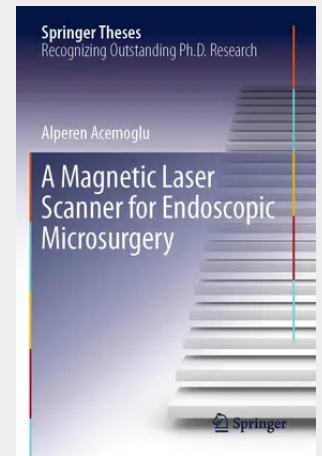
## A Magnetic Laser Scanner for Endoscopic Microsurgery

This book focuses on the design, development, and characterization of a compact magnetic laser scanner for microsurgical applications. In addition, it proposes a laser incision depth controller to be used in soft tissue microsurgeries.

The use of laser scanners in soft tissue microsurgery results in high quality ablations with minimal thermal damage to surrounding tissue. However, current scanner technologies for microsurgery are limited to free-beam lasers, which require direct line-of-sight to the surgical site, from outside the patient. Developing compact laser micromanipulation systems is crucial to introducing laser-scanning capabilities in hard-to-reach surgical sites, e.g., vocal cords.

In this book, the design and fabrication of a magnetically actuated endoscopic laser scanner have been shown, one that introduces high-speed laser scanning for high quality, non-contact tissue ablations in narrow workspaces. Static and dynamic characterization of the system, its teleoperation through a tablet device, and its control modelling for automated trajectory executions have been shown using a fabricated and assembled prototype. Following this, the book discusses how the laser position and velocity control capabilities of the scanner can be used to design a laser incision depth controller to assist surgeons during operations.

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