



Opto-Mechanical Systems Design

Paul R. Yoder

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Opto-Mechanical Systems Design, Fourth Edition is different in many ways from its three earlier editions: coauthor Daniel Vukobratovich has brought his broad expertise in materials, opto-mechanical design, analysis of optical instruments, large mirrors, and structures to bear throughout the book; Jan Nijenhuis has contributed a comprehensive new chapter on kinematics and applications of flexures; and several other experts in special aspects of opto-mechanics have contributed portions of other chapters. An expanded feature?a total of 110 worked-out design examples?has been added to several chapters to show how the theory, equations, and analytical methods can be applied by the reader. Finally, the extended text, new illustrations, new tables of data, and new references have warranted publication of this work in the form of two separate but closely entwined volumes.

The first volume, **Design and Analysis of Opto-Mechanical Assemblies**, addresses topics pertaining primarily to optics smaller than 50 cm aperture. It summarizes the opto-mechanical design process, considers pertinent environmental influences, lists and updates key parameters for materials, illustrates numerous ways for mounting individual and multiple lenses, shows typical ways to design and mount windows and similar components, details designs for many types of prisms and techniques for mounting them, suggests designs and mounting techniques for small mirrors, explains the benefits of kinematic design and uses of flexures, describes how to analyze various types of opto-mechanical interfaces, demonstrates how the strength of glass can be determined and how to estimate stress generated in optics, and explains how changing temperature affects opto-mechanical assemblies.

The second volume, **Design and Analysis of Large Mirrors and Structures**, concentrates on the design and mounting of significantly larger optics and their structures, including a new and important topic: detailed consideration of factors affecting large mirror performance. The book details how to design and fabricate very large single-substrate, segmented, and lightweight mirrors; describes mountings for large mirrors with their optical axes in vertical, horizontal, and variable orientations; indicates how metal and composite mirrors differ from ones made of glass; explains key design aspects of optical instrument structural design; and takes a look at an emerging technology?the evolution and applications of silicon and silicon carbide in mirrors and other types of components for optical applications.



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