



भारतीय ताराभौतिकी संस्थान
INDIAN INSTITUTE OF ASTROPHYSICS
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स्नातक अध्ययन मंडल **Board of Graduate Studies**

IIA - CU - PhD (Tech) Public Ph.D viva-voce examination

वक्ता **Speaker:** Annu Jacob

Research Supervisor: Professor Padmakar Singh Parihar

External Examiner: Dr. Brijesh Kumar, ARIES Nainital

शीर्षक Title: Optimum Design and development of segmented mirror telescope optics and phasing system

सार Abstract

Astronomy today is on the path of constructing large telescopes. Due to several manufacturing and maintenance difficulties, large telescopes of more than 8m are predominantly segmented. To fulfill the need for its growing astronomical community, India is also aspiring to create a 10m class Optical-NIR observing facility. As part of this thesis, we designed telescope optics for the Prototype Segmented Mirror Telescope (PSMT) and proposed 10m class National Large Optical-NIR Telescope (NLOT). We have carried out sensitivity/tolerance analysis and error budget estimation on both telescope designs. Furthermore, a detailed exploration has been carried out to understand the effect of segment size, miss-alignment (tip-tilt, de-center, and clocking), phasing error, segment to segment ROC variations, figure error, and inter-segment gaps on telescope image quality. For the 10m class telescope, we have also explored the possibility of using spherical mirror segments in place of aspheric ones. Any segmented telescope can provide diffraction-limited design performance only if its mirror segments are aligned and phased. So, the second part of this thesis is dedicated to developing phasing techniques, namely, Shack-Hartmann working in the physical optics domain and another one on the pyramid sensor. The basic principles of these two phasing schemes are explored. Then after we have conducted detailed simulations as well as laboratory experimentation. In this talk, we present the design, analysis, and results of studies conducted on PSMT and NLOT telescopes optics and our research on two different techniques for phasing segmented primary mirror.

शुक्रवार Friday 27, मई May 2022

Time: 2:30PM

Remotely online

सभी का स्वागत है All are welcome

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