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स्नातक अध्ययन मंडल Board of Graduate Studies

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

वक्ता Speaker: Satya Ranjan Behera

शीर्षक Title: Design and Dvelopment of closed-loop AO system for 2-m class of telescopes at IIA

सार Abstract
The main objective of the thesis is to develop a laboratory model of closed loop Adaptive Optics system for Indian Astronomical Observatory (IAO) Hanle telescope (having a primary aperture diameter of 2m). The mean value of Fried's Parameter at IAO Hanle is 15 cm at a wavelength 500 nm. So, D/r0 value of Hanle telescope is 12. In order to achieve the same value in the laboratory with deformable mirror actuator size of 450 μm the beam size be 5 mm approximately. Theoretical value of strehl ratio is calculated as 0.54 at 1.1μm. In order to understand the performance of Adaptive Optics system, a laboratory model has been proposed which is scaled down version of 2-m class. Components including Shack-Hartmann wave-front sensor (SHS), continues membrane deformable mirror (CDM) have been studied experimentally. A control algorithm for wave-front reconstruction is developed by using Fried's geometry with vector multiplication method and it is tested for various light intensity levels for different Zernike and Kolmogorov polynomials. sCMOS, which is a low noise and high speed camera is calibrated for inbuilt noises. For a CDM, slope influence function is developed for assessment of CDM performance by giving a specific voltage to an actuator and bias voltages to all other actuators. The performance of slope influence function is tested for various higher order Zernike polynomials. The purpose of the real-time closed-loop control system is to interpret the SHS data to produce a set of meaningful control signals and apply the phase conjugate to the corrector, usually by reconstructing the wave-front.

सोमवार Monday 15, मार्च March 2021

Time: 2:30PM

Online Meeting

सभी का स्वागत है All are welcome

Meeting link

https://iiacolloqmblr.my.webex.com/iiacolloqmblr.my/j.php?MTID=mb9ba4b9e222738df17488a8b121187e0

Meeting number: 158 464 8976
Password: tdsb15321 (83721532 from phones and video systems)