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(Department of Science and Technology, Government of India)
कोरमंगला / KORAMANGALA
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Ph.D. Defense Presentation

Speaker: Avinash Surendran

Title: Development of a Scalable Generic Platform for Adaptive Optics Real Time Control

ABSTRACT

The thesis work is divided into two parts: The Scalable Platform for Adaptive Optics Real-time Control (SPARC), which constitutes 80% of the thesis work, and the Lunar Scintillometer, which was continued into the Ph.D. tenure from the work done as part of the M.Tech dissertation project (and constitutes about 20% of the thesis work).

The primary objective of the SPARC project is to explore the viability of an Adaptive Optics (AO) controlsystem based on FPGAs (Field Programmable Gate Arrays), making active use of their massiveparallel processing capability. Over the last few years, we have implemented a scalable AO kernelon an off-the-shelf inexpensive Xilinx VC-709 development board and demonstrated thecomputational capabilities of the same. The platform is scalable across different numbers of wavefront sensor (WFS) subapertures, pixels per subaperture and the geometry of the WFS. I will be discussing the advantage that an FPGA platform brings to the AO landscape, the implementations which were keyin enabling the development of the platform and the design of the platform along with its features.The results of testing the device after interfacing it with the iRobo-AO hardware will also bediscussed.

Ground layer turbulence characterization is important in deciding the quality of an astronomical site, and in the understanding of the height at which a telescope should be located to bypass the bulk of ground layer turbulence. The lunar scintillometer consists of a linear array of six photodiodes sensitive to the variations in the intensity of moonlight. The linear array of photodiodes is designed to form non-redundant baselines, each of which provides a covariance of intensity fluctuations. The covariance of intensity fluctuations is used to generate the turbulence profile of the ground layer. Few details of the software pipeline and the results from the commissioned instrument's two-year campaign will be described.

Date: July 12th 2019

Venue: IIA Auditorium

Time: 12:15 AM

All are Welcome