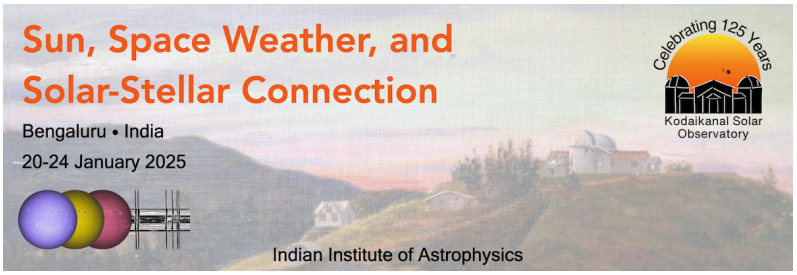

Contribution ID: **134** Type: **Poster**

FPGA-based Fast Data Acquisition System for Solar Adaptive Optics

The correlation tracking and wave-front sensing cameras in an adaptive optics system correct the wavefront error by locking to a feature in the image acquired by the sensor. The feature is cross-correlated with a reference image to identify the relative shift between consecutive images in the sub-aperture images of a Shack-Hartmann wave-front sensor. The typical frequency of data acquisition is about 1000 frames per second. While the software-based optimized cross-correlations may be sufficient when a small number of sub-apertures are used in a wave-front sensor, hardware-accelerated (FPGA) correlations may be required when a large number of sub-aperture images are involved, for example, in the case of the proposed National Large Solar Telescope (NLST) in India. Here, we suggest developing an FPGA-based readout card to acquire the images using a fast image sensor with a bigger pixel size. Also, we aim to demonstrate readout at 1000 frames per second to correct the effects of atmospheric turbulence. This acquisition system will be integrated with the FPGA-based fast correlation method we developed earlier. In this poster, we will present the design aspects of the FPGA-based data acquisition system with a suitable image sensor.

Contribution Type

Poster

Theme

Solar Magnetism in High-Resolution

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Presenter: DVS, Phanindra (Indian Institute of Astrophysics)