

Title: Science with the 0.61-m VASISTHA Telescope at IERCOO: Results and Future Prospects

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Abstract:

The 0.61-m VASISTHA telescope at the Ionospheric and Earthquake Research Centre and Optical Observatory (IERCOO) provides an important facility for optical time-domain astronomy. We present recent scientific results obtained with VASISTHA, demonstrating its capabilities for transient, variable-star, and exoplanet studies. VASISTHA observations contributed VRI-band photometry of the Type II supernova SN 2023ixf, supporting its long-term multiwavelength investigation. The telescope is also used for target-of-opportunity observations of transient and rapidly evolving sources, including comets and other time-sensitive targets. High-cadence R-band observations of the hot Jupiter WASP-12 b resulted in three new transit light curves, demonstrating the capability of VASISTHA for precise time-series photometry of transiting exoplanets. In addition, more than 34 hr of time-series observations of four Galactic open clusters—NGC 2192, NGC 2266, NGC 2509, and IC 1369—resulted in the detection and characterization of new periodic variable stars, including pulsating and rotational variables, as well as an eclipsing binary. Ongoing time-series observations of the open cluster NGC 7245 are being analyzed to search for and characterize additional variable stars. These results demonstrate that the 0.61-m VASISTHA telescope can provide scientifically valuable high-cadence photometry for diverse time-domain programs. Future observations will focus on systematic searches for stellar variability in open clusters, investigations of binary and blue straggler populations, transit observations of exoplanets, and photometric monitoring of transient and other variable sources.