

DETERMINATION OF THE STELLAR SCINTILLATION PROPERTIES WITH THE FAST-PHOTOMETRIC CAMERA

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ABSTRACT. In the present study it is shown that a television camera with adjustable signal storage time enables to measure the frequency and amplitude of the stellar scintillation. It can be used for telescopes with adaptive optics to substantially improve the image quality.

The commonly used array astrophysical observation instruments operate in the long storage time modes. At that, the scintillation effects are averaged, and only integral characteristics can be determined from the observations. The observational technique of the atmospheric research with the laser beam requires special-purpose equipment and processing. A television camera with adjustable storage time allows of measuring the frequency and amplitude of the stellar scintillation. A star's radiant image can be resulted from observations using such a camera with the storage time of several television frames. The scintillation properties can be determined by the number of rays, their length and shape. If the radiant image is steady, it means that the ratio of the storage time to the period is expressed as a multiple. And the multipleness is defined by the number of rays. For the rotating image the ratio is to be a fraction. It is even possible to measure the scintillation properties when displaying the data on a TV screen. The computer image processing is required to determine the values accurately. The described instrument can also be used for telescopes with adaptive optics. That will enable to significantly improve the image quality. For the spectral observations, the spectrograph limiting magnitude and the signal-to-noise ratio are increased.

References

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