SOFTWARE FOR PROCESSING TV METEOR IMAGES

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Observational material comprises an archive of video footages collected during regular television observations performed by meteor watch (patrol) in 2003-2018.

We justified the need for creating unconventional software for processing meteor images in TV frames.

Three fundamental principles are laid down in the algorithm employed in photometric processing:

1. Before image processing starts, astrometric reference stars, imaged in the frame, shall be found. Cartesian co-ordinates of all measured stars are used to find centroid positions for individual stars, thus creating a mask which enables to improve the accuracy of measurements and avoid any errors due to radiation detector noise.

2. A circular aperture is used when calculating the intensity values of pixels throughout the star image. Intensity values of the imaged star pixels in the aperture are summed up proportionally to the area of each respective pixel in the aperture.

3. Adaptive optics techniques are used to choose the size of measuring aperture for each measured star.

Observational selection bias has been detected using television and telescopic observations, as well as observations conducted with astronomy cameras with short and long focal length objectives. In particular, we have studied such processes as quasi-continuous disintegration of meteors, breaking of meteors into fragments and asymmetry of meteor wakes.

A significant difference of images of disintegrating meteors shows a huge observational selectivity which fundamentally alters information about this process per se and the number of fragments of a meteor that undergoes disintegration. As a result, telescopic observations are favoured for studying the fine structure in meteor images.

The paper also discusses the prospects for implementation of the created software package to study different physical processes that occur during meteor events.