A spectrographic system used to analyze meteors

Francisco Espartero, Observatorio Andaluz de Astronomia, Spain

Abstract

Statement of the Problem: The study of meteoroids with large-field cameras as they enter the Earth's atmosphere has traditionally employed video and photography techniques using diffraction gratings. This enables the study of the physical-chemical nature of meteoroids and, in some cases, the parent body from which they come. The analysis of this data permits a broader view of how different techniques can contribute to our understanding of interplanetary matter through astrometry and spectrography. Two spectrographs have been linked together so that they capture the same object simultaneously. Their optics are different, however, since they include two CCD cameras have different formats and resolutions. The main objective is to improve on the results that are obtained with video cameras, as can be seen with respect to two meteors that were captured by both spectrographs and whose results have been analyzed.

Conclusion and significance: Video cameras are more sensitive than spectrographs and can detect less bright meteors. The positive feature of these two techniques is that, while the spectra captured by the video cameras offer a low resolution, the CCD of the spectrographs can provide more detailed information and with better spectral resolution. In our case study the second order spectrum is detected at higher resolutions and the spectral range is increased in the Infrared- and even more so in the Ultraviolet part of the spectrum, from 3,400 Å to 10,000 Å.

Recent Publications

Espartero, F., Martínez G., Frías M., Montes F. S. Castro-Tirado A. 2018. Autonomous spectrographic system to analyze the main elements of fireball and meteors. *Earth, Planets & Space*, 70:02.

Espartero, F. and Madiedo, J. M. 2016. The Northern ω-Scorpiid Meteoroid Stream: Orbits and Emission Spectra. *Earth, Moon, and Planets*, *118*(2-3), 81-89.

Madiedo, J. M., Espartero, F., Castro-Tirado, A. J. 2016. An Earth-grazing fireball from the Daytime zeta-Perseid shower observed over Spain on 2012 June 10**.** Monthly Notices of the Royal Astronomical Society, Volume 460, Issue 1, 917-922.

Madiedo J. M., Espartero, F., Trigo-Rodriguez, Josep M., Castro-Tirado, A. J. 2016. Observations of the Quadrantid meteor shower from 2008 to 2012: Orbits and emission spectra, Icarus, Volume 275, 193-202.

Espartero, F. & Madiedo, J. M. 2015. Emission Spectrum of a Kappa-Cygnid Meteor Afterglow. *46th Lunar and Planetary Science Conference*, held March 16-20, 2015 in The Woodlands, Texas. LPI Contribution No. 1832, 1163.



Biography

Francisco Espartero is director of the Andalusian Observatory of Astronomy. He holds a Doctor's degree in Astrophysics from the Complutense University of Madrid, a Master in Physics and Mathematics from the University of Granada, a Master in Astronomy and Astrophysics from Valencian International University and a degree in Mechanical Engineering from the University of Ávila. He has worked for several multinational companies in the engineering sector and is now C.E.O. of ECS Engineering & Astrophysics. Currently, his main areas of research are the study of fireballs and meteors, as well as a new range of low cost robotic astronomical observatories. www.esparterocs.com

Email: espartero@astroalcala.es

Notes/Comments: