# A new look on Apollo 17 LEAM data

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One of the unresolved enigmas from the Apollo era is the existence and characteristics of highly electrically charged dust floating above the lunar surface. Potential evidence for this hypothesized phenomenon came from the Lunar Ejecta and Meteorites (LEAM) experiment on Apollo 17. This instrument reported up to hundreds of impact events per day around local sunrise and sunset whereas the expected impact rate of interplanetary dust particles was only a few impact detections per day[1]. The LEAM instrument consisted of three sensor facing different directions. Upon impact onto a sensor it recorded up to four impact charge signals and one microphone signal. Most puzzling was the fact that these events registered in the front channel only, but frequently with the maximum possible pulse height. Additionally, the LEAM operating temperature exceeded its predicted maximum value of ~60ºC at lunar noon (Figure 1), indicating possible thermal problems that were initially believed to be responsible for generating noise in the electronics, and possibly responsible for the elevated impact rates. Several technical studies were performed that supported the view that LEAM was registering slow-moving, highly-charged lunar dust particles (Perkins and Berg, 1979)[2]. Recently, new arguments were raised[3] that the signals recorded by LEAM may be caused by interferences from heater current switching which occurred most frequently near sunrise and sunset. In order to shed light on this controversy a new look into LEAM data was initiated within the NLSI /CCLDAS project. The purpose of this analysis is to find in the ALSEP and LEAM house keeping data evidence for excessive power switching and correlated signals in the LEAM science data. A second goal is to verify the earlier analysis by Berg et al., (1975) and to find evidence for impacts of interplanetary meteoroids in the LEAM data available to us.

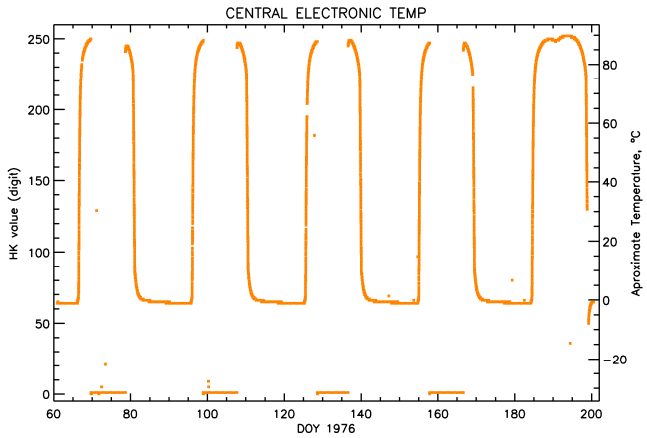


**Figure 1.** Central electronic temperatures in 1976. When the temperatures rose beyond approx. 90°C the instrument switched off.

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[1] Berg, O.E., Wolf, H., Rhee, J.W., 1975, in: Lecture Notes in Physics 48, 233.
[2] Berg, O. E., Perkins, D., Space Science Instrumentation, 4, 329-337, 1979
[3] O'Brien, B., 2011, Planet. Space Sci., doi:10.1016/j.pss.2011.04.016.