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SREM performance during Planck/SOVT2

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1 Introduction

From October 14 to 17 the second ground segment validation test SOVT2 of the Planck spacecraft has been carried out. The operation of SREM was part of this test. SREM related results of these tests are summarized in this document.

2 SREM performance

2.1 Operation plan

SREM was switched on around 07:00 UTC on October 14, 2008. It was programmed to measure series of 10 accumulations of 50 seconds each followed by a HK data reading and a subsequent reading of the RadFET parameters. The operation lasted for 4 whole days.

The epoch of the data was artificially set to cover the period from April 9 to April 13, 2009.

The raw data was retrieved once per day from the Planck DDS, was decoded and saved into CDF-files.

2.2 Observations

Figure 1 shows the series of SREM measurements (ACC: accumulations, HK: HK data readings, and RAD: RadFET parameter readings). The upper panel covers the whole period, whereas the lower panel shows only a short extract of 45 minutes. In the lower panel the regular series of 10 ACC and HK followed by a RAD can be seen.

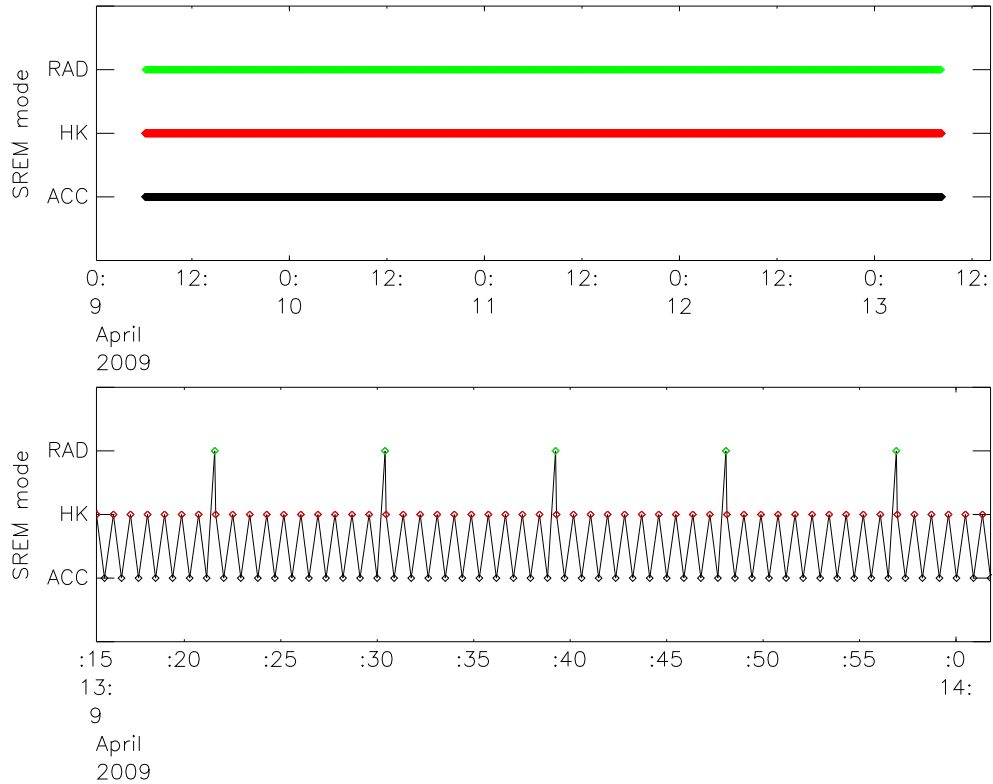


Figure 1: Type of SREM measurements during SOVT2. The black dots represent data accumulations, the red dots, HK readings, and the green dots represent the RadFET readings.

In the upper panel of Figure 2 the accumulation time deduced from the start and stop times

contained in the raw data files is plotted. For all data accumulations the nominal value of 50 seconds is found.

In the lower panel of Figure 2 the gap between the end of a accumulation and the start of the succeeding accumulation is plotted versus time. The values are 3 ± 0.1 seconds.

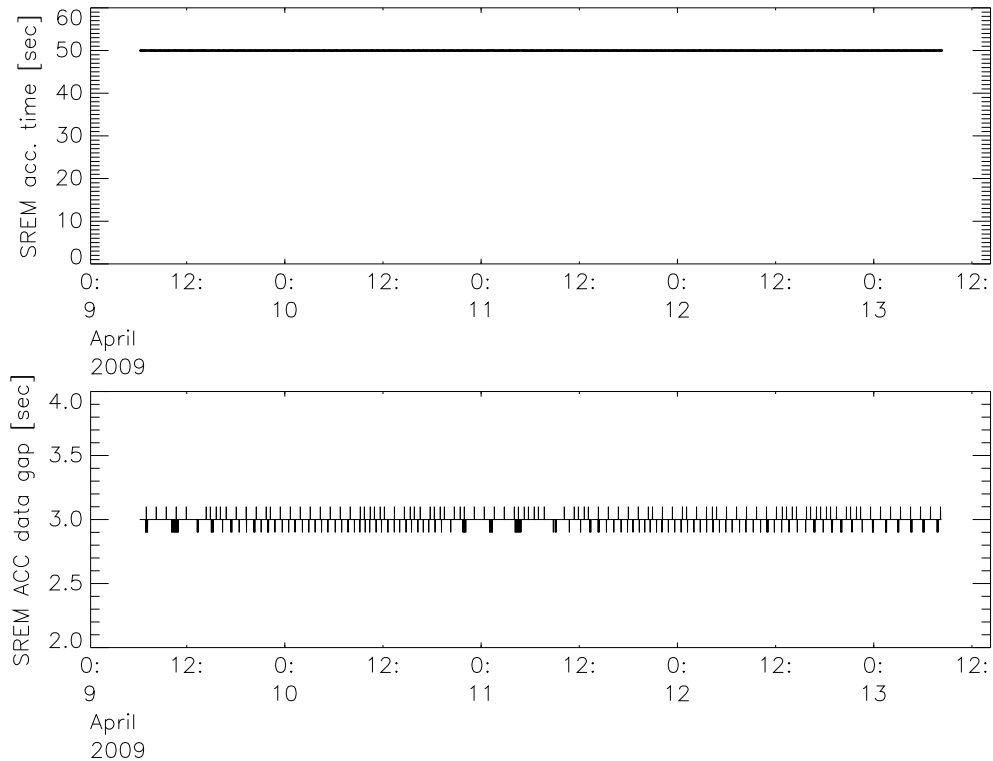


Figure 2: The upper panel shows the accumulation time which for all data points corresponds to the nominal value of 50 seconds. In the lower panel the time between the end of an accumulation and the start of the succeeding accumulation is plotted. In all case the gap is 3 ± 0.1 seconds.

Figure 3 shows the counting rates in SREM counter TC1 (red), TC2 (black), and TC3 (green). The rates are mostly below 0.1 counts per second, except for very few accumulations, where the rate is significantly higher. The average rates are 0.015 (TC1), 0.026 (TC2), and 0.014 (TC3). Whereas the upper panel shows the entire period, the lower panel displays a short period containing two accumulations with exceptionally high counting rates. The shape of the histograms (not shown here) indicate, that these high count rates might be caused by enhanced radiation background rather than by electronic noise.

2.3 Conclusions

During the Planck SOVT2 SREM has been working as was intended! The commanding and operation of the instrument seems to be understood. Telemetry and data formats are as defined in the relevant documents.

A missing part in the data processing chain is the processing of the satellite orbit and attitude information which needs to be provided by the Flight Dynamics in the form of the so called AHF (Attitude History File). The procedures to follow for this are currently under discussion.

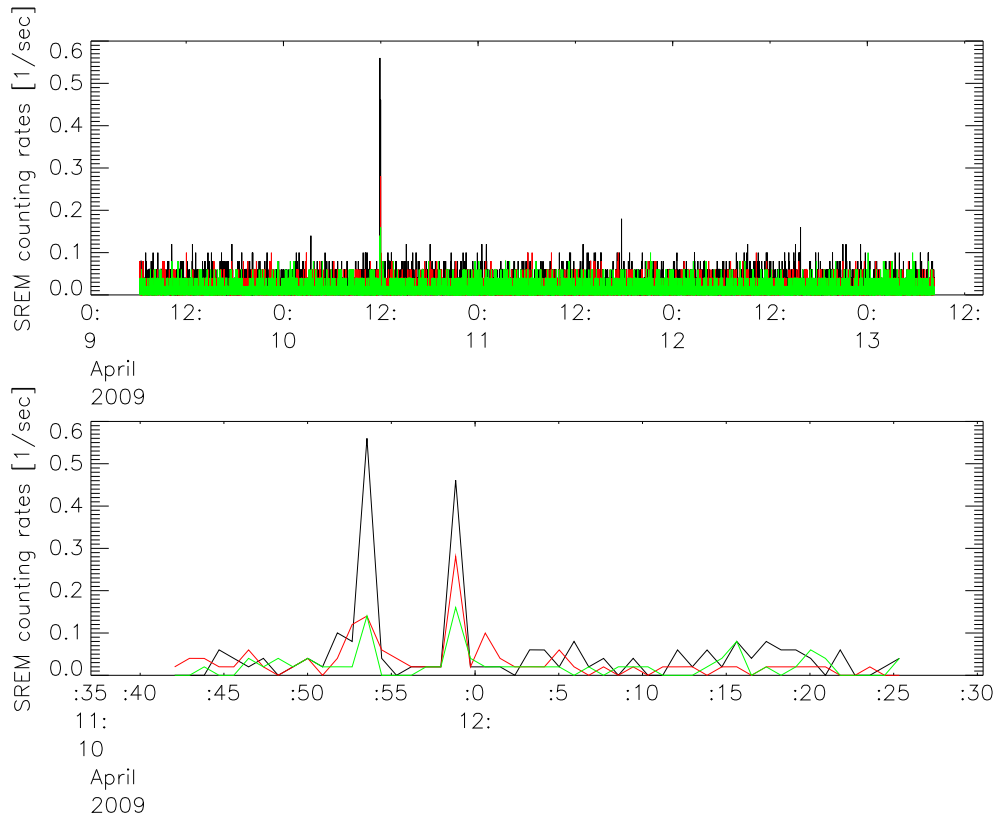


Figure 3: SREM counting rates as function of time TC1 (red), TC2 (black), and TC3 (green). The upper panel shows the entire time period. The lower panel shows a short period containing accumulations with exceptionally high counting rates.