

SiPM evolution.

The long time evolution of SiPMs has been studied for three periods : July 2007, May 2008 and July 2008 . Data of 72 runs have been used , 24 runs in each month.

Summary:

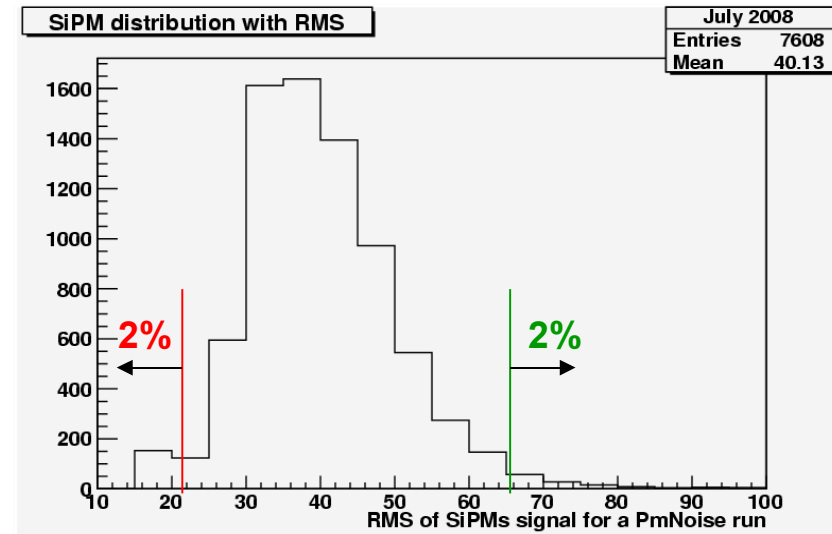
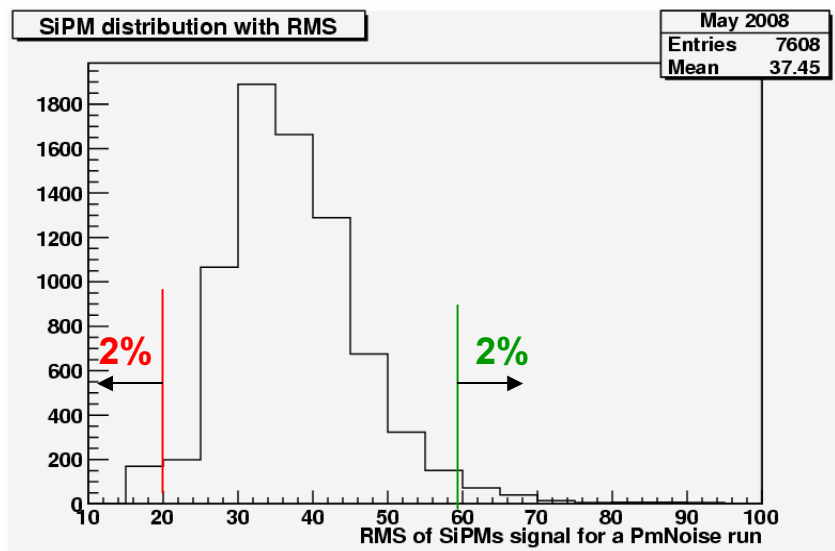
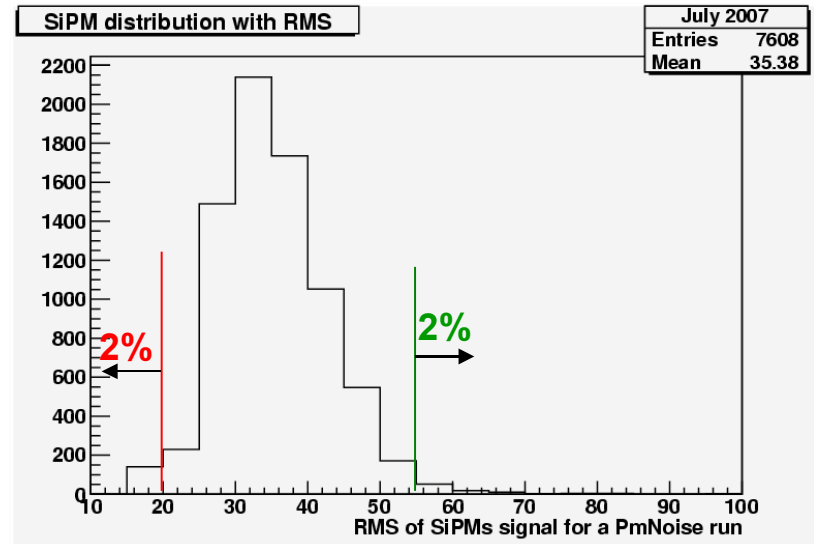
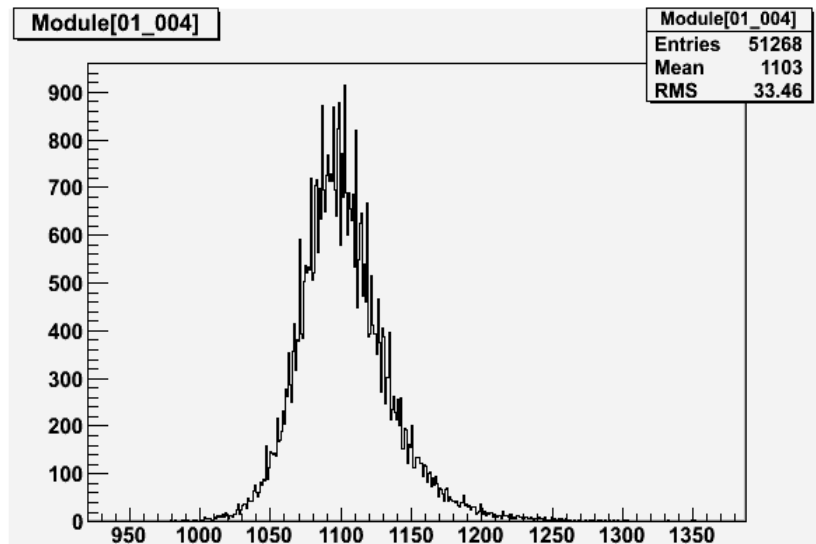
- The kit of nonworking SiPMs is different from run to run while the full number of unreliable SiPMs slowly increases with time and now is near 200.
- There exists small fraction of SiPMs with slowly growing noise . For 10 of them the increasing of noise became escalating with time .

Oleg Markin , ITEP , Moscow.

.The RMS of SiPM signal in pure pedestal runs has been chosen to separate SiPMs into fractions .

. Nonworking SiPMs are in the RMS region smaller **than 20** .

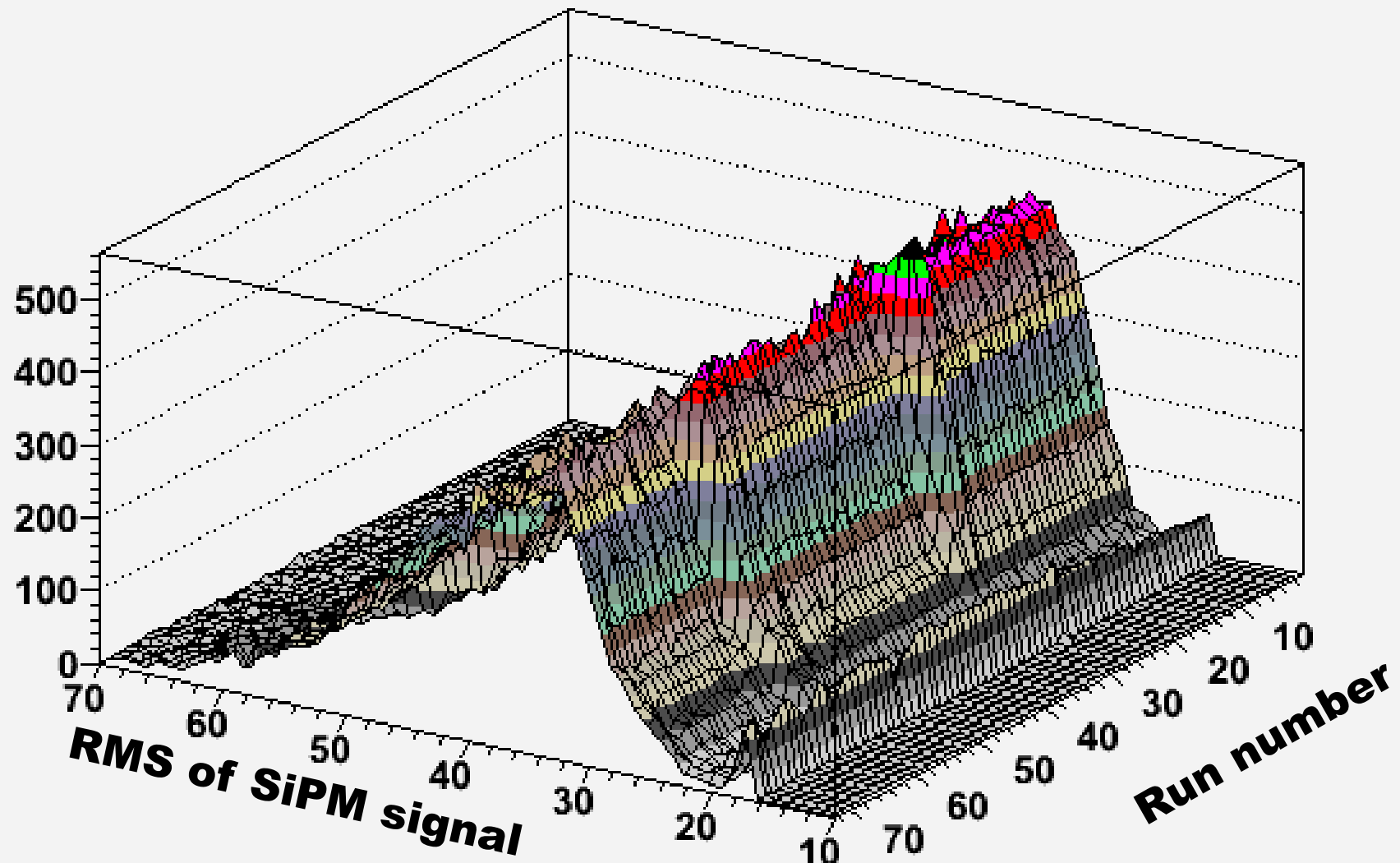
. Too noisy SiPMs are in the RMS region higher **than 55**.



- . The number of SiPMs with RMS smaller than 20 grows with time .
- . The surface breaks when High Voltage settings were changed .

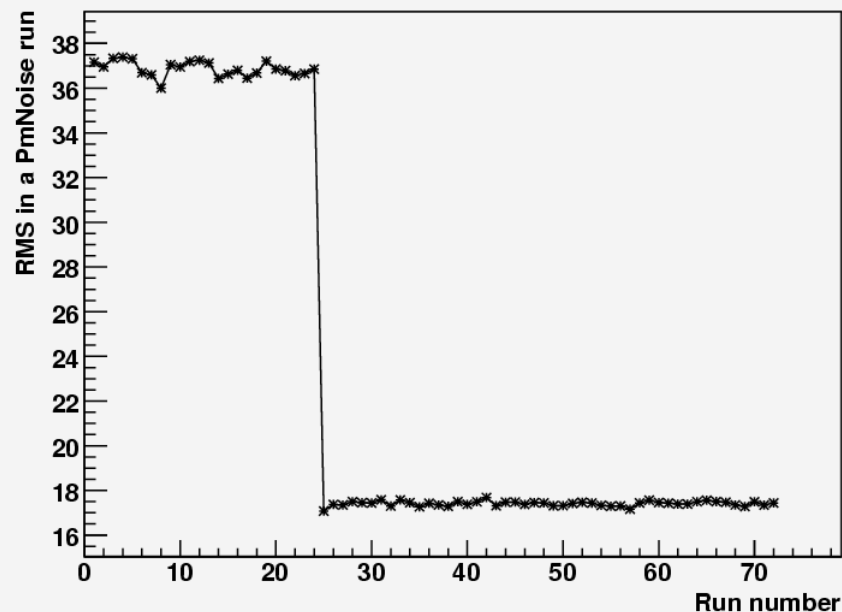
SiPM distribution with RMS versus run number 1...72

Evolution during 3 periods



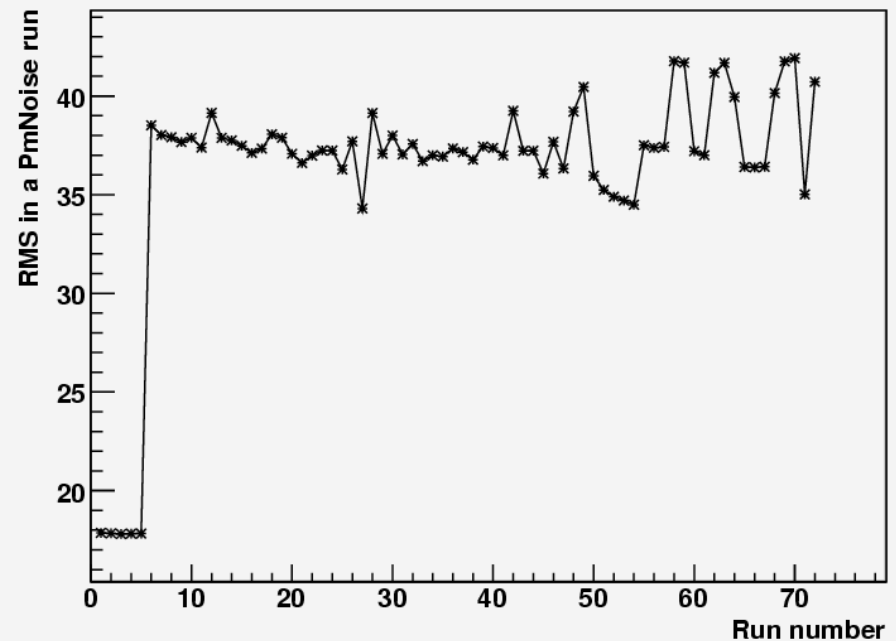
- . There are 24 cases of quick SiPM transformation from good to dead and 3 cases v.v.
- . There are no clear cases of smooth evolution of a SiPM from good to dead or v.v. , only sharp transformation, in one run .

SiPM# 07_143 behavior



24 cases

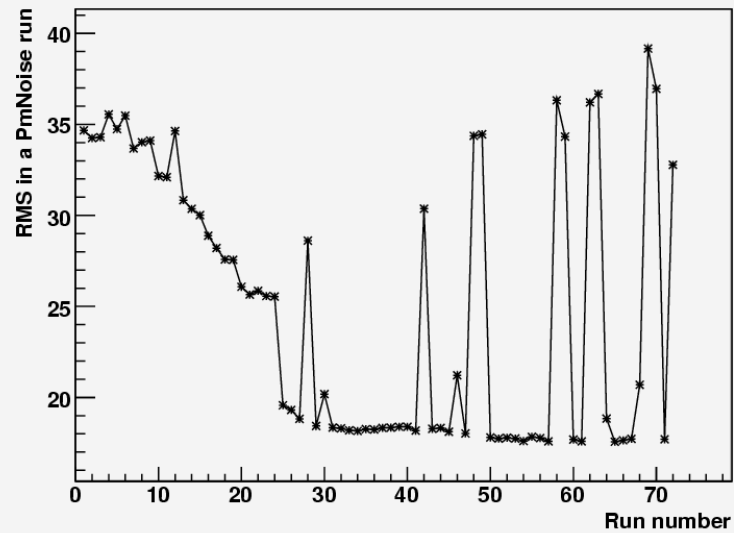
SiPM# 29_076 behavior



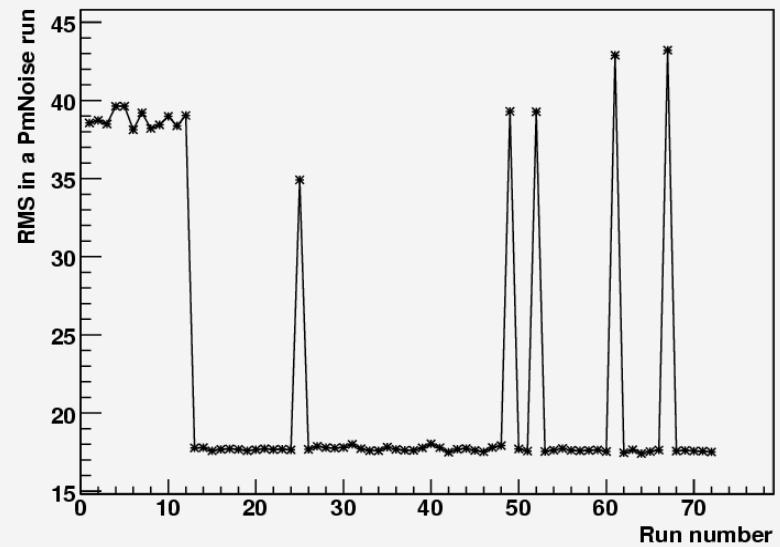
3 cases

. There are 111 cases of SiPM oscillation from working to nonworking .

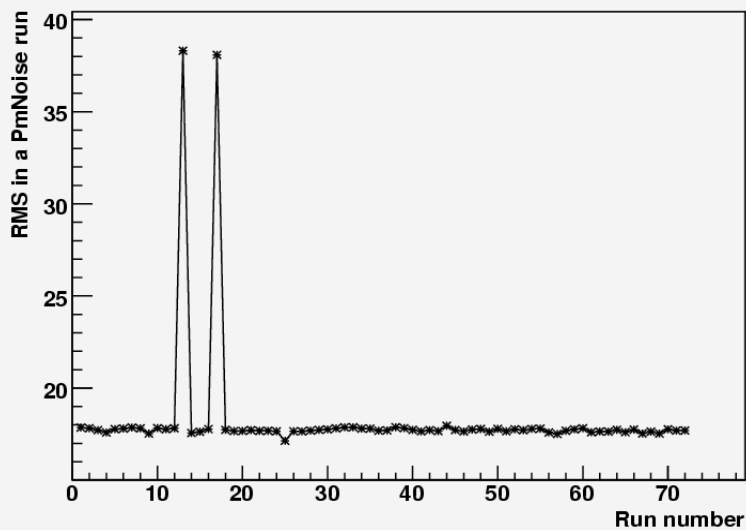
SiPM# 29_061 behavior



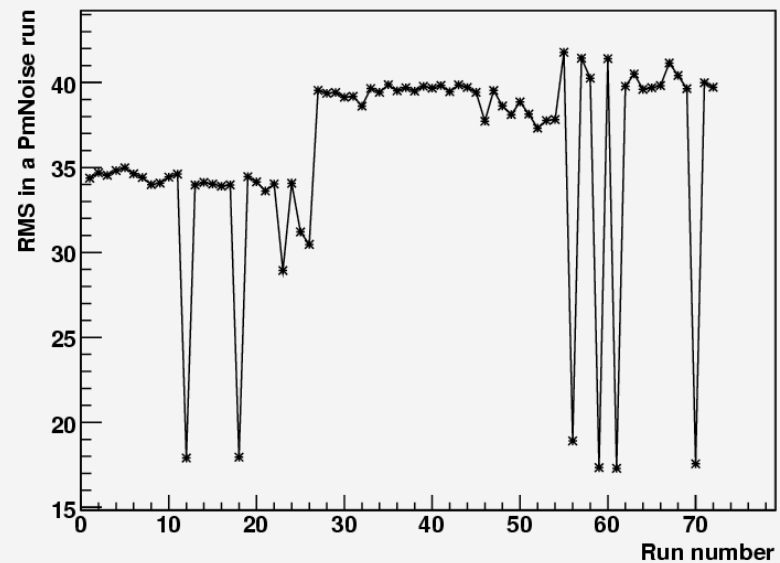
SiPM# 03_037 behavior



SiPM# 03_094 behavior

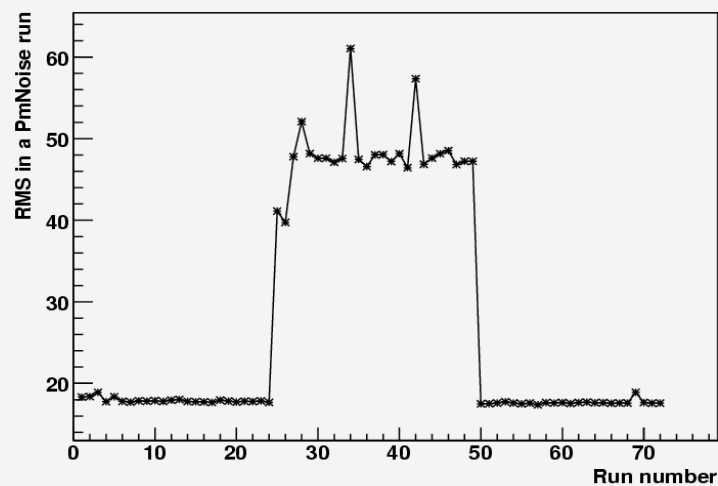


SiPM# 04_190 behavior

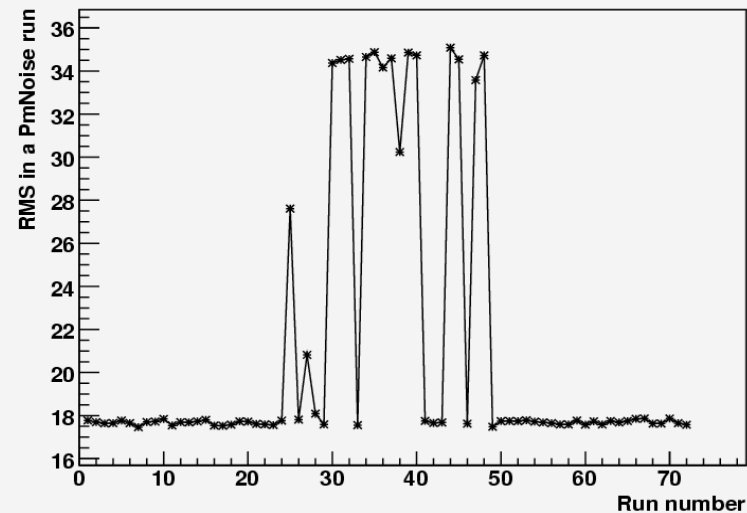


. A lot of oscillating SiPMs change their status every studying month - at runs 25 and 49 .

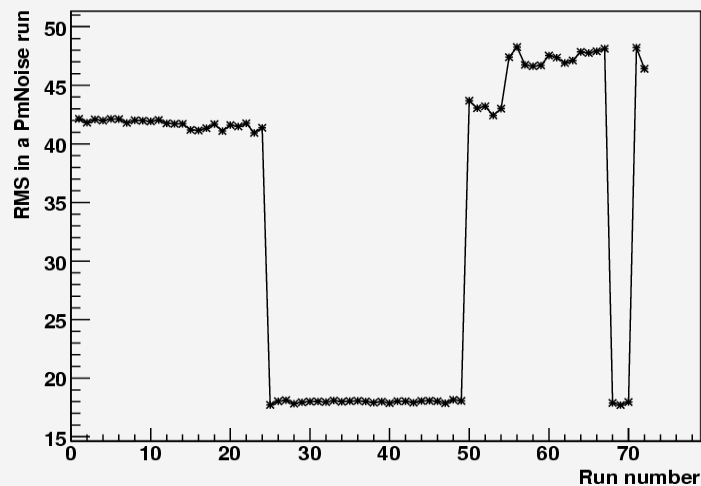
SiPM# 01_000 behavior



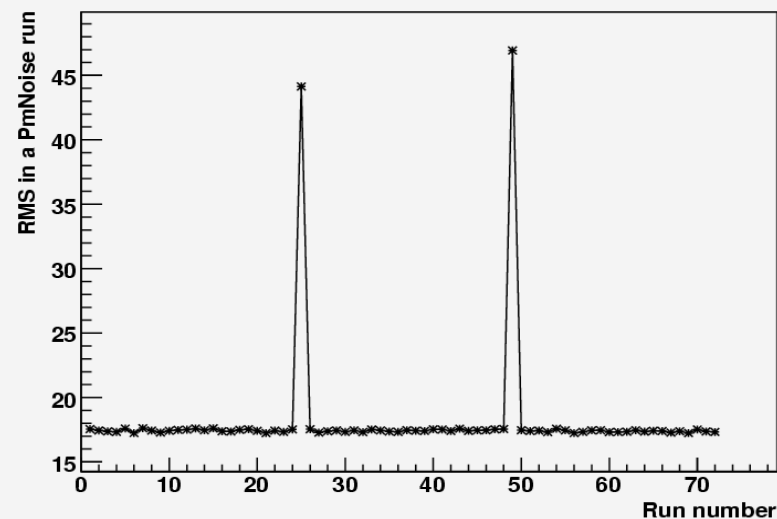
SiPM# 04_039 behavior



SiPM# 03_148 behavior



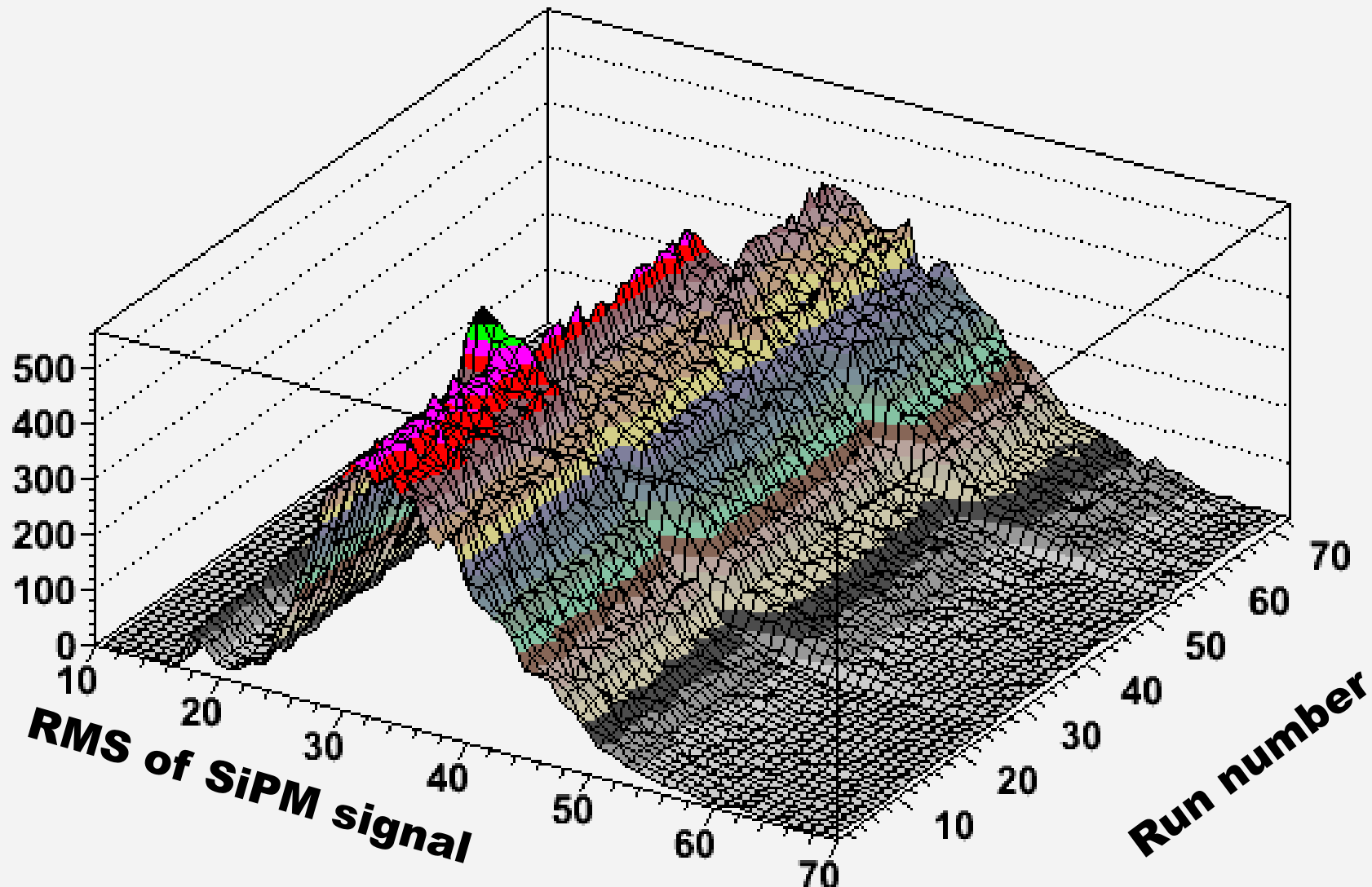
SiPM# 03_053 behavior



- . High Voltage settings were changed at runs 27 and 55 .
- . Between the voltage changing the number of noisy SiPM almost did not grow.

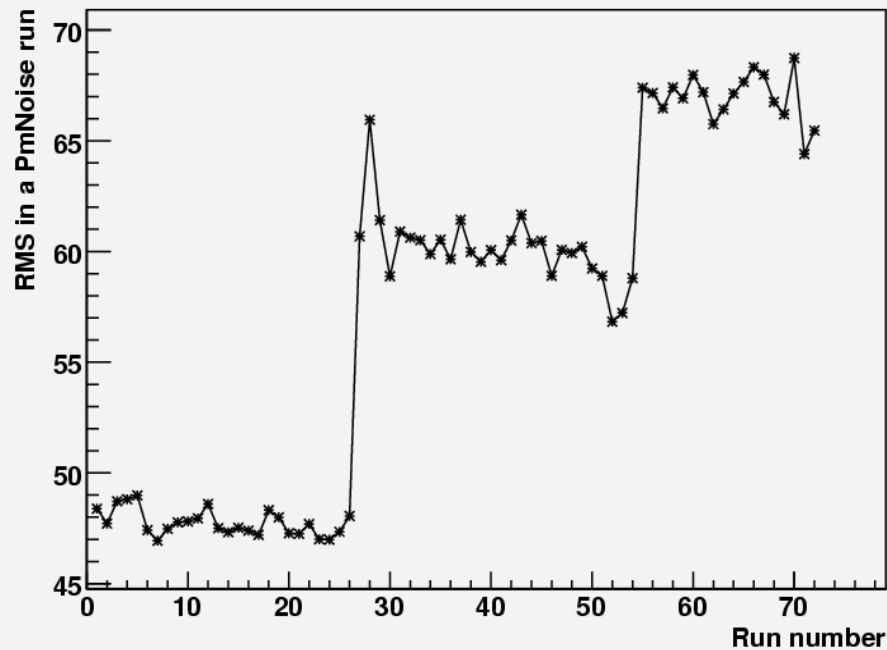
SiPM distribution with RMS versus run number 1...72

Evolution during 3 periods

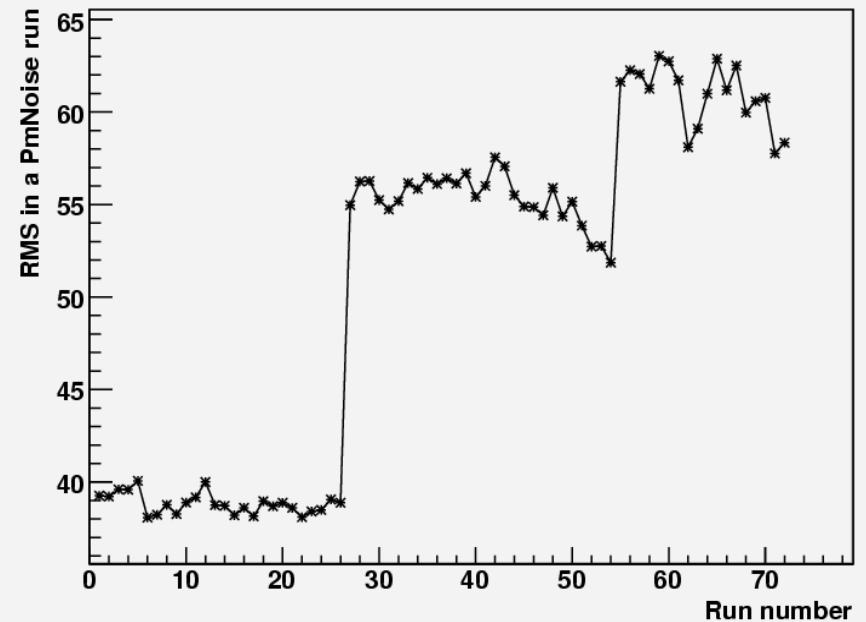


The High Voltage settings were changed for optimization of signal-noise ratio and have increased the SiPM noise.

SiPM# 01_020 behavior

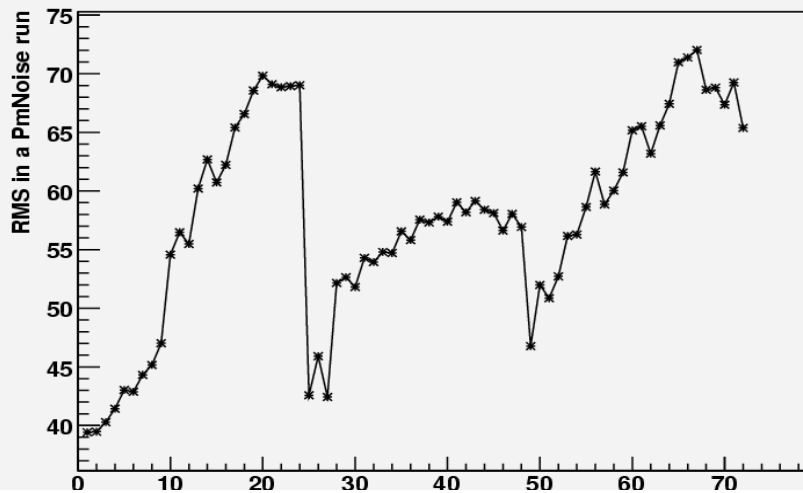


SiPM# 02_159 behavior

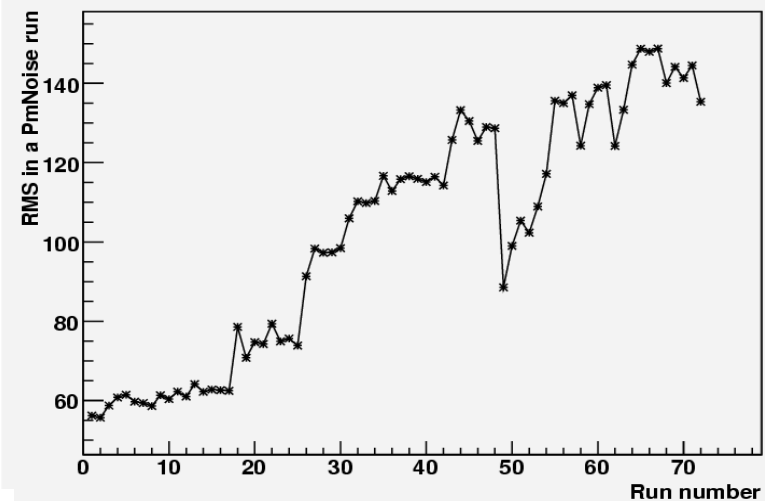


- Among near a hundred noisy SiPMs which had RMS between 55 and 60 on July 2007 there were 32 SiPMs with growing RMS.
- For 8 of them RMS has increased more than 20% from initial value during July 2007, then — differently.

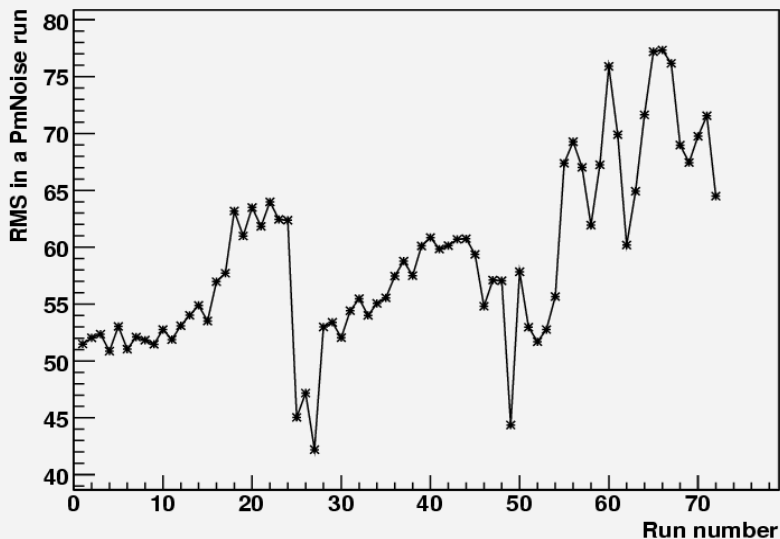
SiPM# 15_143 behavior



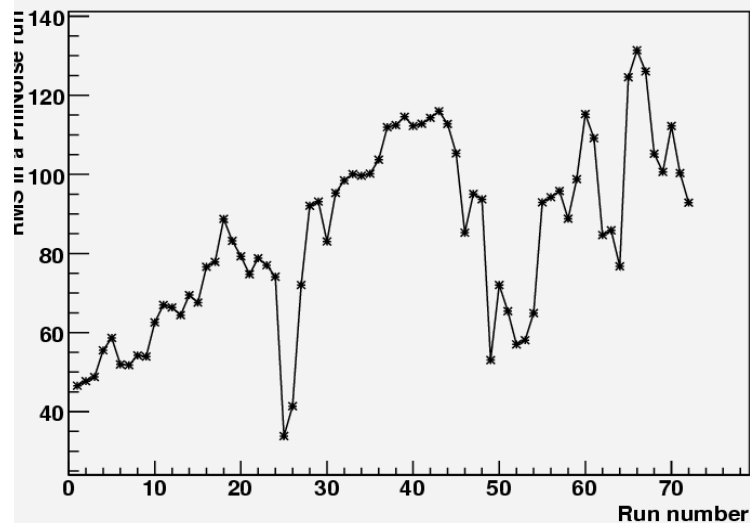
SiPM# 21_022 behavior



SiPM# 34_194 behavior

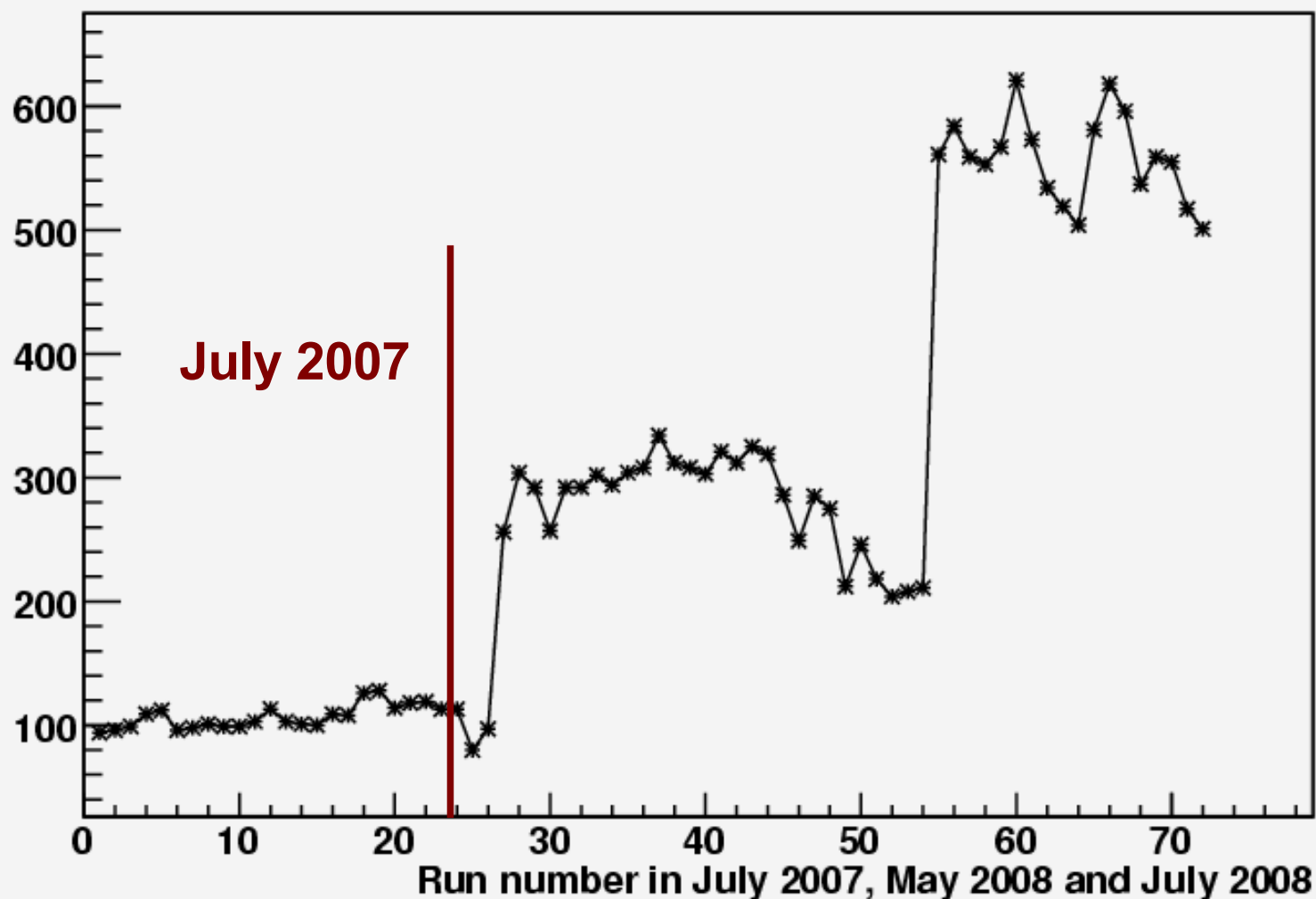


SiPM# 06_168 behavior



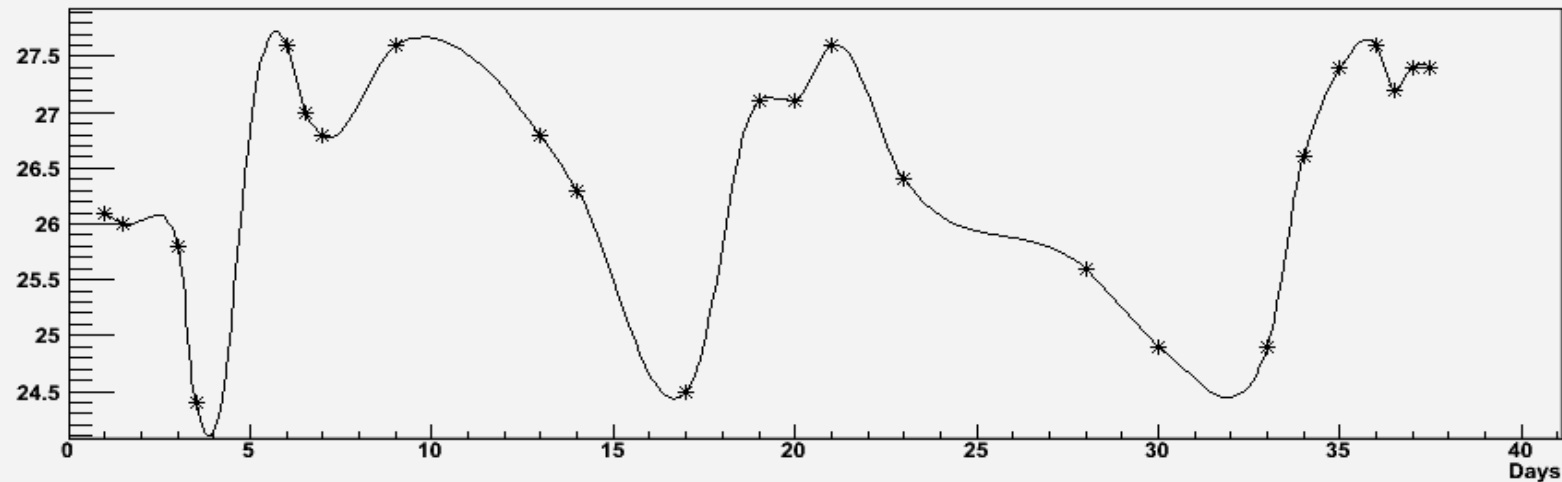
- . The full number of pretty noisy SiPMs slowly grows from run to run and jumps with the changing of High Voltage settings .

The number of SiPM with RMS > 55.0



- . The number of noisy SiPMs fluctuate with time because of the RMS inverse correlation with the external temperature .

The temperature in July 2007



Average RMS in July 2007

