

Search for time-dependent fluctuations in cosmic rays spectra with the AMS01 detector

Towards averaged Kinetic Energy Spectra :

detector lifetime $\Delta t(\Delta|\Theta_m|, \Delta\Phi_m)$

Averaged kinetic energy spectra

$$\bar{F}(E_k, \cos \Theta_m, \Phi_m) = \frac{\sum_i N_i(E_k, \cos \Theta_m, \Phi_m) - b}{\varepsilon \Delta t(\cos \Theta_m, \Phi_m)}$$

Kinetic Energy: $E_k \Rightarrow \Delta E_k$

Geomagnetic Latitude and Longitude: $\Theta_m, \Phi_m \Rightarrow \Delta \Theta_m, \Delta \Phi_m$

Number of particles with Kinetic Energy E_k in range $(\cos \Theta_m, \Phi_m)$: N_i

Lifetime in range $(\cos \Theta_m, \Phi_m)$: $\Delta t(\cos \Theta_m, \Phi_m) \Rightarrow \Delta t(\Delta |\Theta_m|, \Delta \Phi_m)$

Background: b

Detector Acceptance: ε

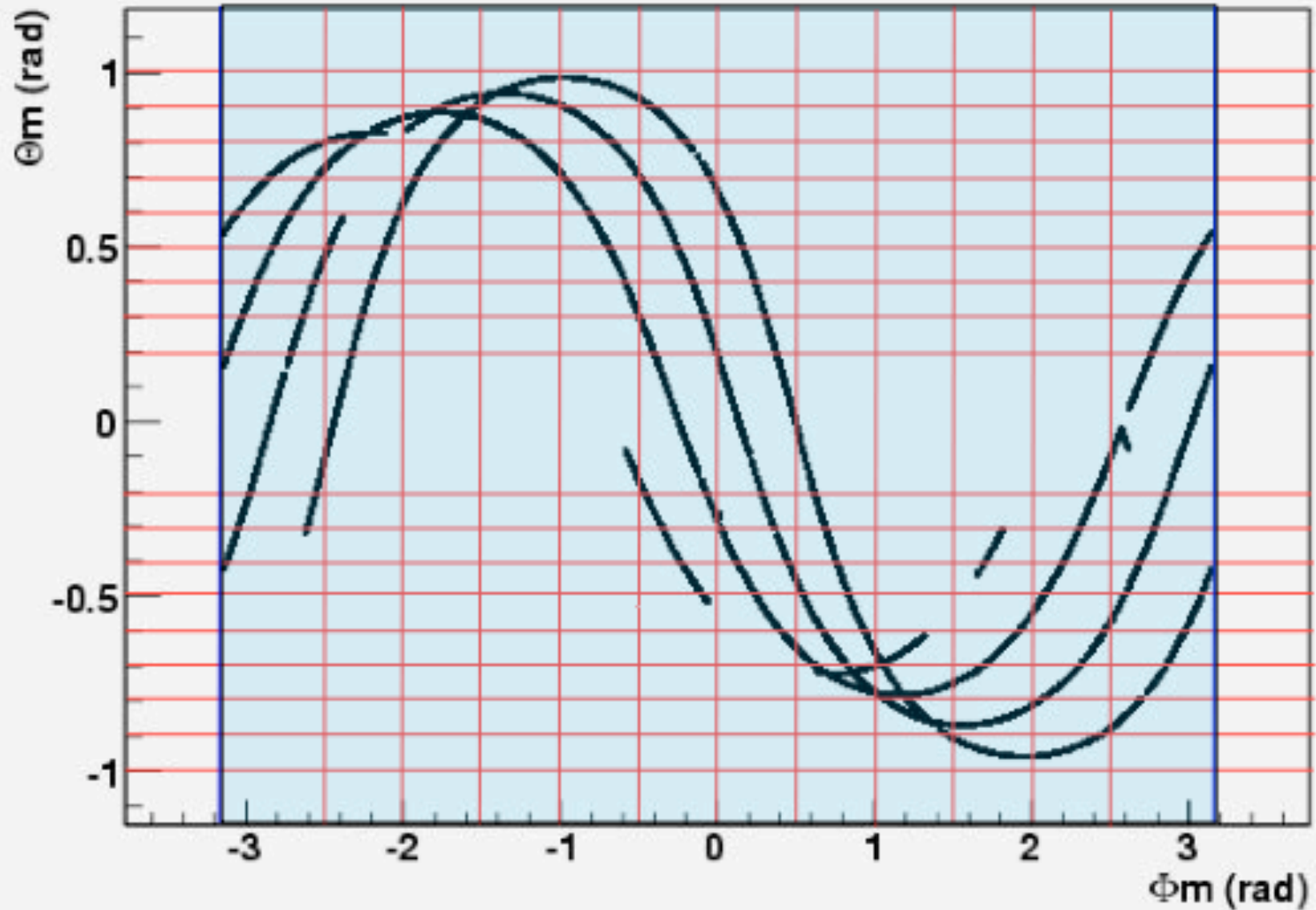
Geomagnetic latitude, θ_m , and longitude, Φ_m , ranges (rad)

1. $|\theta_m| < 0.2$;
2. $0.2 \leq |\theta_m| < 0.3$;
3. $0.3 \leq |\theta_m| < 0.4$;
4. $0.4 \leq |\theta_m| < 0.5$;
5. $0.5 \leq |\theta_m| < 0.6$;
6. $0.6 \leq |\theta_m| < 0.7$;
7. $0.7 \leq |\theta_m| < 0.8$;
8. $0.8 \leq |\theta_m| < 0.9$;
9. $0.9 \leq |\theta_m| < 1.0$;
10. $|\theta_m| \geq 1.0$

1. $\Phi_m < -2.5$;
2. $-2.5 \leq \Phi_m < -2.0$;
3. $-2.0 \leq \Phi_m < -1.5$;
4. $-1.5 \leq \Phi_m < -1.0$;
5. $-1.0 \leq \Phi_m < -0.5$;
6. $-0.5 \leq \Phi_m < 0$;
7. $0 \leq \Phi_m < 0.5$;
8. $0.5 \leq \Phi_m < 1.0$;
9. $1.0 \leq \Phi_m < 1.5$;
10. $1.5 \leq \Phi_m < 2.0$;
11. $2.0 \leq \Phi_m < 2.5$;
12. $\Phi_m \geq 2.5$

Geomagnetic latitude, θ_m , and longitude, Φ_m , bins

Shuttle geomagnetic latitude vs geomagnetic longitude



Data sample

- 9 862 567 triggered events

start: June 3, 1998 5h32 AM GMT

end: June 4, 1998 11h52 AM GMT

Shuttle altitude: 340 Km

Detector Pointing: $45^{\circ} \pm 1^{\circ}$ to Zenith

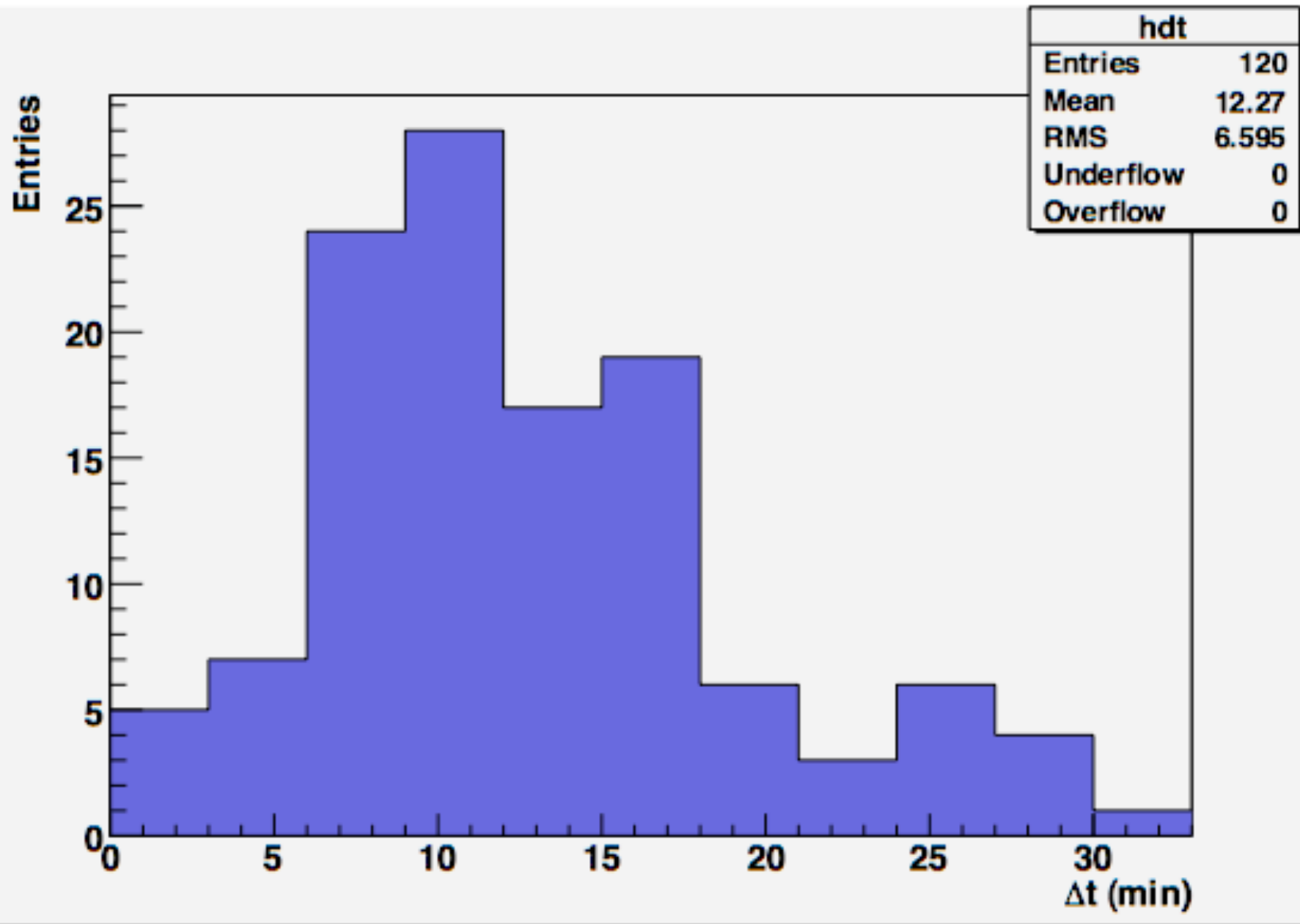
The Earth was not in AMS field of view

(not full statistics for this configuration)

Lifetime in range $(\Delta|\Theta_m|, \Delta\Phi_m)$: $\Delta t(\Delta|\Theta_m|, \Delta\Phi_m)$ (min)

$\Phi_m \backslash \Theta_m $	$-\pi; -2.5$	$-2.5; -2$	$-2; -1.5$	$-1.5; -1$	$-1; -0.5$	$-0.5; 0$	$0; 0.5$	$0.5; 1$	$1; 1.5$	$1.5; 2$	$2; 2.5$	$2.5; \pi$
$\pi; 0.2$	26	14	14	21	26	30	27	13	11	17	17	29
$0.2; 0.3$	12	8	6	9	15	15	13	9	7	9	6	16
$0.3; 0.4$	11	11	6	10	15	14	16	9	6	10	6	16
$0.4; 0.5$	14	9	7	10	12	19	15	9	8	8	7	15
$0.5; 0.6$	16	9	7	9	11	18	14	15	8	8	9	13
$0.6; 0.7$	19	10	10	11	13	13	23	23	16	9	15	16
$0.7; 0.8$	27	19	15	12	14	6	6	26	25	11	14	19
$0.8; 0.9$	4	17	24	20	11	9	5	6	28	15	7	8
$0.9; 1.0$	6	4	14	25	14	9	9	11	2	17	7	5
$1.0; \pi$	11	8	6	0	3	5	4	0	0	.5	9	11

$\Delta t(\Delta|\Theta_m, \Delta\Phi_m)$ distribution



Solar flares duration:

BATSE Flare List

Current time:98/08/07, 1727

Number of flares selected = 5

BATSE Event	Start Date yy/mm/dd	Start Time hhmm:ss	Peak Time hhmm:ss	Duration (sec)	Peak rate (counts / s/2000cm ²)	Total Counts (counts)	Burst Trigger #	Triggertime (seconds of day)
5039	98/06/03	2305:11	2305:42	44	857	10987	0	0
5022	98/06/04	2038:31	2039:01	43	1406	11766	6805	74326
5038	98/06/05	1418:16	1418:36	41	773	18226	0	0
5037	98/06/09	1612:24	1612:29	8	860	3199	0	0
5023	98/06/12	0915:57	0918:37	267	1510	25119	0	0

March 22, 2006

AMS-unige meeting

DATA TAKING starting time: June 3, 1998 5h32 AM GMT

DATA TAKING ending time: June 4, 1998 11h52 AM GMT

Total time : 30h20min

EFFECTIVE DATA TAKING time:

$$\sum_{i=1}^{120} \Delta t(\cos|\Theta_m|, \Phi_m) \cong 25\text{h}27\text{min}$$

⇒ Holes in data acquisition are not taken into account

Work in progress:

Counting number of particles (e^- , p , He)

with kinetic energy in range ΔE_k

in geomagnetic coordinates bin $(\Delta|\Theta_m|, \Delta\Phi_m)$:

$$\sum_i N_i(\Delta E_k, \Delta|\Theta_m|, \Delta\Phi_m)$$