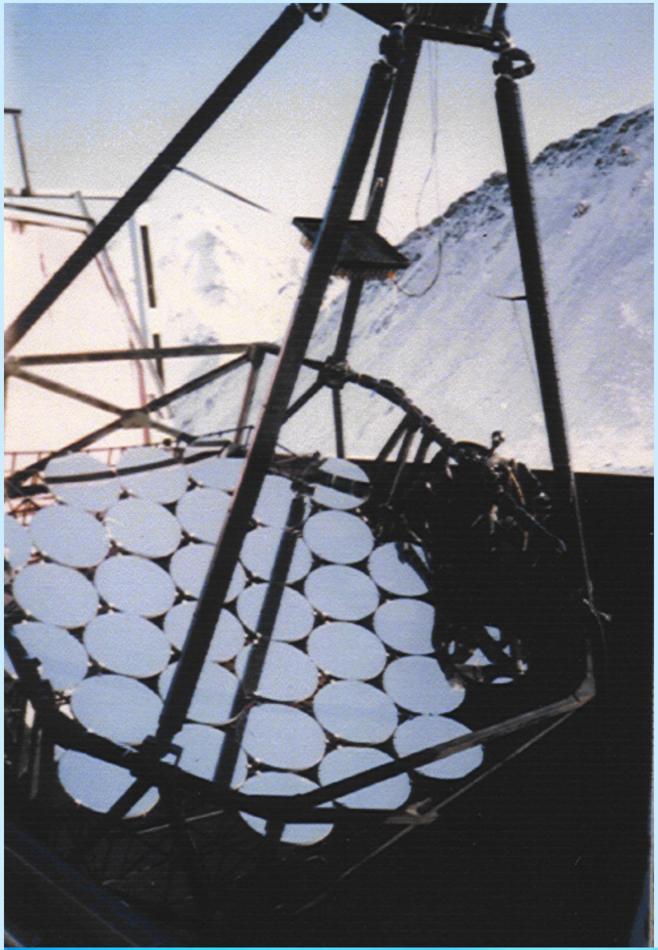

A search for astrophysical point sources of neutrino with high mountain SHALON mirror Cherenkov telescope

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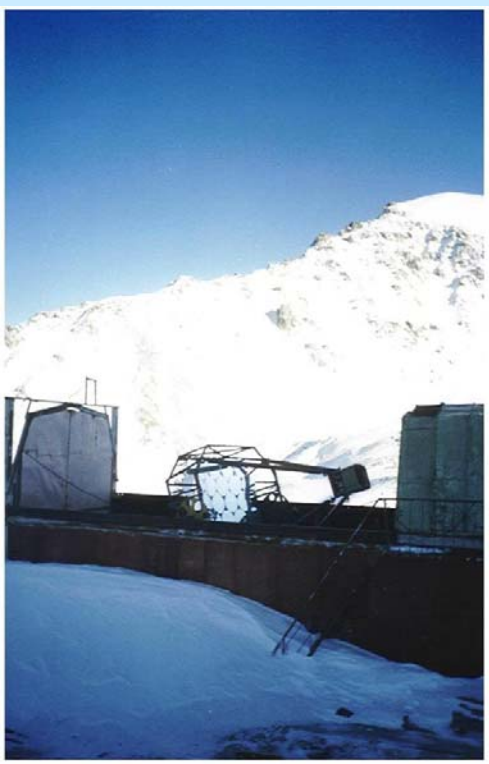
Leninsky prospect 53, Moscow, 119991 Russia

DIRECTION OF TeV TO PeV NEUTRINOS AND γ-rays WITH THE HIGH MOUNTAIN SHALON MIRROR CHERENKOV TELESCOPE.



A greater understanding of modern physics and astrophysics will be realized by investigating galactic and metagalactic objects, where the proton and nucleus acceleration processes, accompanied with the generation of gamma-quanta and neutrinos are not dissipated by the magnetic fields of the Universe.

However, there is an evidence that, cosmic gamma rays are attenuated by the infrared, microwave and radio background photons.

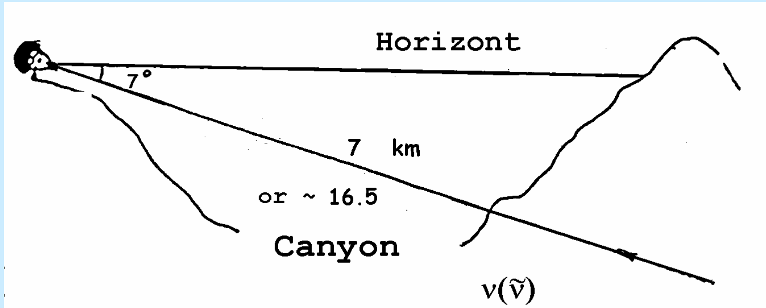
Only neutrino-astronomy will complete the search and investigation of galactic and metagalactic objects.

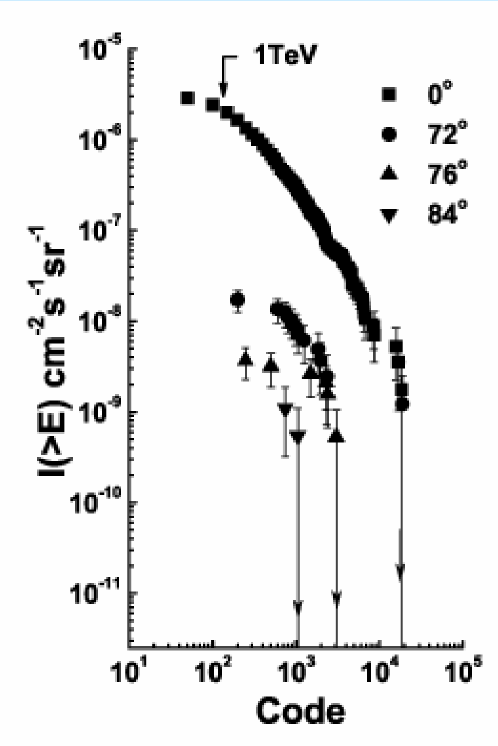
Problems in observation of extensive air showers generated by neutrinos are connected with an extremely small cross section of inelastic collisions of neutrinos with nuclei.

DIRECTION OF TeV TO PeV NEUTRINOS AND γ-rays WITH THE HIGH MOUNTAIN SHALON MIRROR CHERENKOV TELESCOPE.

A neutrino telescope detects the Cherenkov radiation generated in water or ice by passage of relativistic charged particles produced by neutrino collisions with nucleons in the detector volume. Because of weakness of neutrino interaction the very large detector volume is required. Some alternative approaches have been proposed. One of them is using a earth matter or mountain as a target volume for conversion neutrinos to leptons which then initiate extensive air shower (EAS) in the atmosphere, then showers can be detected by Cherenkov telescope. Observations of neutrino initiated EAS at the mountain shadow seems attractive because of mountain valley screened from background showers of cosmic rays and the only particles that can survive are neutrinos with energies $> 10^{13}$ eV came under the horizon. The cascades with energy $> 10^{13}$ eV are generated by neutrino in the ground of mountain on the thickness <300 g/cm^2. The Cherenkov radiation of the hadron cascades will be observed along the direction of neutrino by gamma-telescope placed on the distance about 7 kms from a mountain slope in area of more than 7×10^5m^2. So, UHE neutrinos may be searched in observations at large zenith angle.

Extensive Air Showers under a Large Zenith Angle





EVENT No 224
23:52:39.71

0^0

13	18	17	11	39	46	29	67	35	40	40	20
8	0	21	25	0	42	58	86	60	67	44	21
0	22	27	70	0	109	108	75	87	53	41	22
0	0	17	72	686	624	164	147	180	100	83	79
15	0	66	112	391	1379	797	1300	244	131	214	166
7	23	27	98	143	144	493	767	799	497	599	297
11	15	13	30	50	79	122	257	184	246	284	260
11	14	24	23	34	58	133	88	124	126	167	175
9	13	27	24	23	33	41	53	52	31	58	69
7	13	24	12	22	12	65	58	48	110	47	57
10	14	19	22	14	18	45	28	0	21	31	53
11	17	8	9	21	19	24	17	14	26	34	23

EVENT No 46
23:35:50.56

0^0

0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	5	0	0	0	0	0
0	0	0	0	0	20	18	0	0	0	0	0
0	0	0	0	8	32	43	16	6	0	0	0
0	0	0	0	0	0	50	29	8	4	0	0
0	0	0	0	0	0	6	7	0	6	0	5
0	0	0	0	0	0	0	0	0	0	7	0

EVENT No 5
4:20:42.72

72^0

0	0	0	0	0	0	0	0	9	7	0	7
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	5	0	5	10	11	6	5
11	15	17	8	5	0	0	0	0	0	0	0
10	49	537	19	0	0	0	0	0	0	0	0
0	17	23	15	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

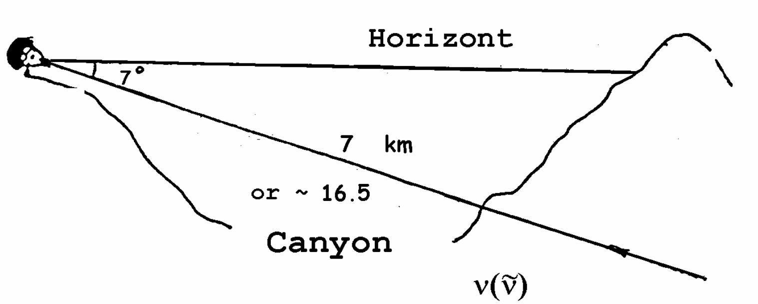
EVENT No 7
1: 3:51.71

97^0

0	11	28	10	0	28	16	45	22	43	75	32
92	0	78	25	0	34	39	64	85	85	67	27
33	71	58	54	40	53	21	64	53	33	22	6
37	34	44	39	45	69	0	47	45	52	21	33
88	0	181	65	32	52	27	182	19	24	40	68
20	89	53	107	64	57	30	36	40	35	95	57
38	81	42	75	12	55	34	41	43	39	30	50
90	53	86	36	34	42	57	25	30	38	41	44
58	69	69	36	27	45	73	42	24	12	31	30
36	28	70	13	55	10	99	57	62	114	32	52
14	26	78	34	12	66	70	129	0	26	27	61
67	141	58	34	66	53	58	41	15	68	70	0

The telescope is calibrated according to the observations of EAS of cosmic ray at 0^o - zenith angle. The cosmic ray shower image detected in the SHALON telescope, generally is elliptic spot in the light receiver matrix, written in the ADC counts (CODE).

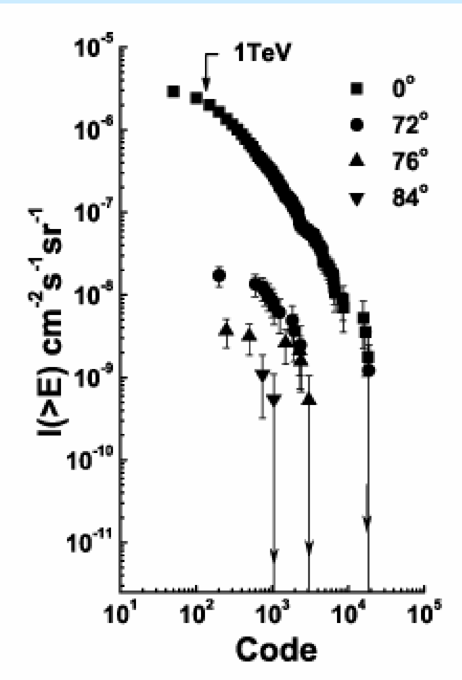
Observations at large zenith angles have been aimed on study of spectra of the air showers induced by cosmic rays crossing through different atmosphere thickness and events accompanying the passing of EAS and cosmic ray particles near horizon. The observation at large zenith angles 72^o, 76^o, 84^o showed that the efficiency of Cherenkov light detection drops essentially as a zenith angle increases, perhaps because of dissipation and absorption in the atmosphere. So, the comparison of observation results shown that at the zenith angle 84^o the number of observed showers is ~ 25 times less than expected by estimation with neglecting by absorption and dissipation of Cherenkov photons in the atmosphere.



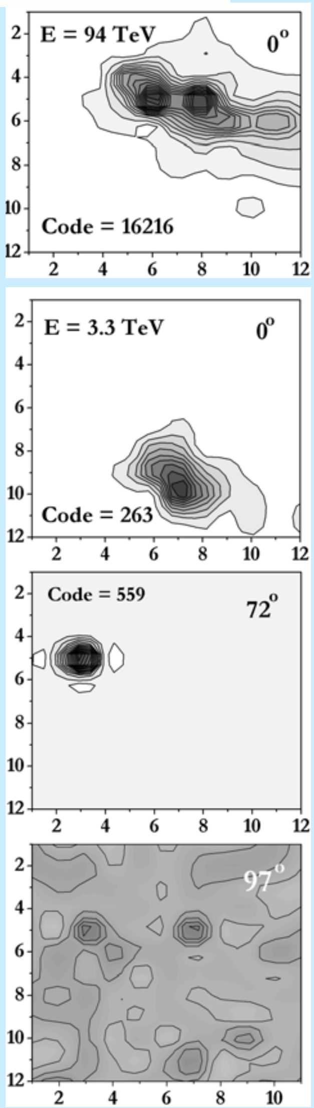
Extensive Air Showers under a Large Zenith Angle

The analysis of the observations allows one to make the following conclusion. At first, a night star sky doesn't produce any background events, preventing the observations of electron-photon cascades coming from under the earth surface. Secondary, the observation of Cherenkov bursts from extensive air showers under the large zenith angles, for example using of horizontal extensive air showers for investigation of an energy spectrum of ultra-high energy cosmic rays is complicated by absorption of Cherenkov photons by a large atmosphere thickness.

Zenith angle, Θ^o	Atmosphere depth, g/cm^2	Number of Cherenkov bursts per hour
72^o	2250	7 ± 1.14
76^o	3000	1.8 ± 0.5
84^o	5950	0.5 ± 0.01



The spectra of showers observed under 0^o, 72^o, 76^o and 84^o zenith angles



The amplitude of gray - scale shower image is propotional to the ADC count. The number, named CODE, shows the range of detected signals in the ADC counts, which are propotional to shower energy.

The observations of Cherenkov bursts under the 97 deg zenith angle

97°

28.10.92
EVENT No 1
23:30:38.17

4	2	7	10	11	13	12	12	0	6	7	0
6	1	0	1	5	5	0	1	5	4	3	4
3	3	1	2	2	4	3	5	1	1	7	3
6	7	0	5	9	2	3	1	5	2	1	7
1	2	4	1	17	14	0	5	5	2	3	3
3	4	4	0	5	5	3	7	11	7	5	6
1	1	0	0	4	5	4	9	1	2	1	1
5	4	0	3	2	16	5	1	11	0	7	16
0	4	6	5	20	47	24	12	5	4	3	3
4	6	2	7	23	43	165	71	17	9	17	2
0	0	3	12	1	25	33	14	20	1	2	1
5	0	6	6	12	13	24	1	0	7	6	5

08.10.04
EVENT No 1
22:58:38.17

0	0	0	0	0	0	0	0	0	0	0	0
0	0	5	0	0	0	0	0	0	0	0	0
0	6	0	0	0	0	0	25	0	0	0	0
0	0	0	0	0	0	0	23	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	22	38	0	0	0
0	0	0	0	0	0	0	0	0	12	0	0
0	0	0	0	11	5	0	0	14	11	0	0
0	0	0	0	0	0	0	0	50	52	7	0
0	0	0	0	5	0	0	5	8	114	0	0
0	0	0	0	0	0	0	0	0	0	5	0
0	0	0	0	0	0	0	5	7	0	53	0

EVENT No 4
23:45:46. 1

0	0	0	0	0	0	0	0	0	0	5	0
0	0	8	0	0	0	0	0	0	67	6	0
0	0	6	0	0	0	0	0	0	18	0	0
0	0	0	0	0	0	10	0	8	12	0	0
0	0	0	0	0	0	0	7	10	6	7	0
0	0	0	0	0	0	0	6	17	0	6	0
0	0	6	6	0	0	0	14	42	5	0	0
0	0	0	0	10	0	0	12	37	6	0	0
0	0	0	0	0	0	0	26	0	0	0	0
0	0	0	0	0	0	20	40	17	0	0	0
0	0	0	0	0	0	11	75	0	0	0	0
0	0	0	8	0	11	11	10	0	0	0	0

12.10.04
EVENT No 6
1: 6: 7.70

0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	48	12
0	0	0	0	0	0	0	0	0	0	13	41
0	0	0	0	0	0	0	0	0	0	21	21
0	0	0	0	0	0	0	0	0	22	134	0
0	0	0	0	0	0	0	0	10	23	74	9
0	5	5	0	15	9	0	11	11	48	18	8
0	0	0	0	0	0	0	0	0	28	7	0
0	0	0	0	0	0	5	0	13	32	0	0
0	0	0	0	0	0	0	0	0	5	0	0
0	0	0	8	0	0	0	21	7	0	0	0

10.01.05
EVENT No 2
23:17: 2. 1

14	17	8	8	0	11	12	11	5	5	0	6
30	0	16	7	0	0	0	0	0	0	0	0
24	246	63	79	23	0	0	0	0	5	0	0
10	68	98	27	11	8	5	0	0	0	0	0
0	7	284	65	45	0	0	13	0	0	18	0
0	10	0	52	23	13	0	0	0	0	0	0
0	9	13	41	43	0	16	19	0	0	0	0
0	0	0	0	41	21	0	19	5	9	13	0
0	0	0	0	0	11	5	0	0	0	0	0
0	0	0	0	16	0	20	5	8	125	8	0
0	0	0	6	0	0	0	0	0	0	0	0
0	0	0	0	6	0	11	12	0	0	0	17

0°

EVENT No 462
1:13:46.33

0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	6	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	9	9	7	12	6	9	0	0	0	0
0	0	6	16	21	37	67	27	8	7	8	0
0	5	12	13	33	44	163	87	20	0	0	0
0	0	11	5	11	12	116	64	13	0	0	0
0	0	0	0	0	8	16	15	0	0	0	0
0	0	0	0	7	8	9	6	0	0	0	0

EVENT No 1116
0:37:25.35

0	0	0	0	0	0	0	0	0	0	0	0
6	0	7	9	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	5	0	0	0	0	0	0	0	0	0	0
0	0	0	0	10	0	0	0	0	0	0	0
0	0	0	0	9	7	0	0	0	0	0	0
0	0	0	5	11	0	9	0	0	0	0	0
0	0	0	0	0	25	22	0	5	0	0	0
0	0	0	0	0	15	51	0	0	0	0	0
0	0	0	0	0	0	115	44	10	0	0	0
0	0	0	0	0	0	0	13	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

EVENT No 226
2:29:31.91

0	0	0	0	0	0	0	8	0	0	5	0
0	0	0	0	0	0	5	26	11	0	0	0
0	0	0	0	0	0	12	29	11	0	0	0
0	0	0	0	6	8	28	21	9	0	0	0
0	0	8	0	8	11	51	23	0	0	0	0
0	0	0	0	0	0	16	0	0	0	0	0
0	0	0	0	7	0	0	0	0	0	5	0
0	0	0	0	6	28	13	0	0	0	0	0
0	0	7	9	15	34	31	0	5	0	0	0
0	6	5	0	14	6	9	0	0	0	0	0
0	0	0	0	0	9	0	0	0	0	0	0
0	7	7	7	5	5	0	0	0	0	0	0

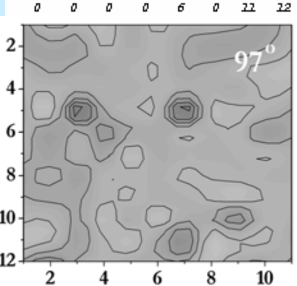
EVENT No 1766
1:23:46. 6

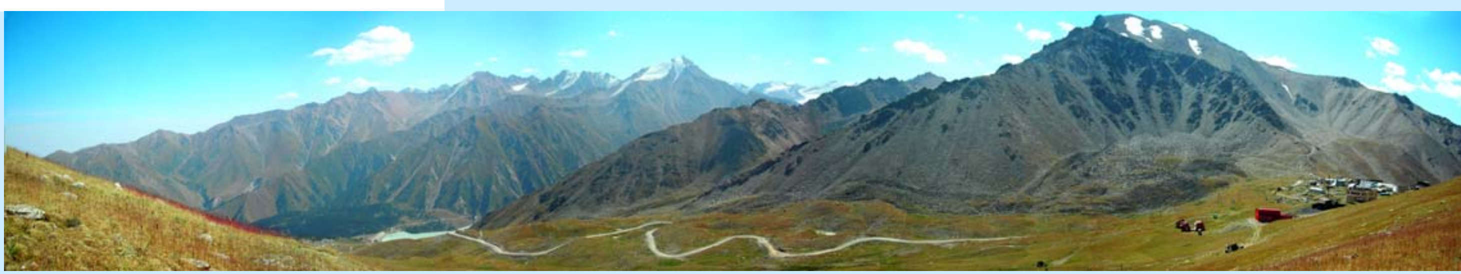
0	0	0	0	0	0	0	0	0	0	0	0
6	5	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	6	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	43	18	0
0	0	0	0	0	0	0	10	37	103	50	0
0	0	0	0	0	0	0	7	35	20	6	0
0	0	0	0	0	0	0	0	25	8	8	0
0	0	0	0	0	0	11	18	19	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

EVENT No 318
23: 8:49. 5

161	198	67	7	0	0	0	0	0	0	0	0
34	101	40	12	0	0	0	0	0	0	0	0
47	247	206	93	17	0	0	0	0	0	0	0
13	44	63	24	33	15	0	0	0	5	6	0
25	65	294	60	28	0	6	0	0	0	0	0
9	67	70	119	15	0	0	0	0	0	0	0
7	21	22	28	32	0	8	0	0	0	0	0
7	14	37	60	0	9	5	0	0	0	0	0
0	0	20	23	34	20	10	0	0	0	0	0
5	6	25	12	20	0	5	0	0	20	0	0
0	0	10	8	15	19	7	5	0	0	0	0
0	0	0	0	6	0	0	0	5	0	0	0

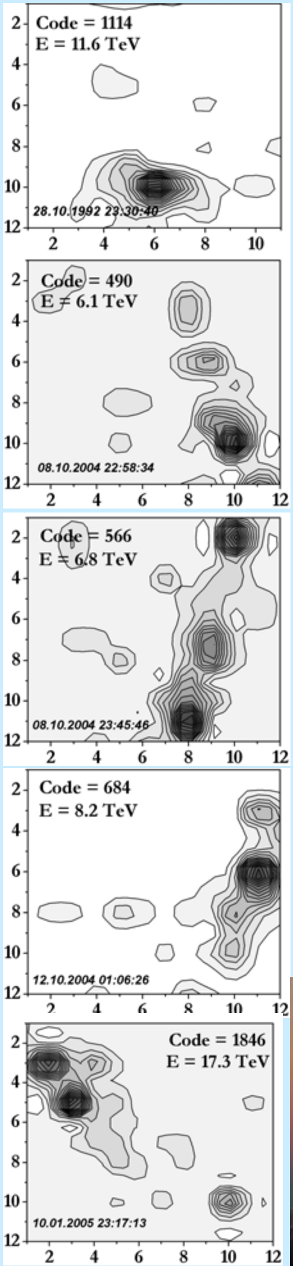
SHALON Cherenkov mirror telescope is located at 3338 m a.s.l. The mountain range lies in the east direction and is more than 4300 m a.s.l. The mountain range is about 20 km long. The thickens of matter in the telescopic field of view is from 2000 to 800 kms; viewed mountain slope area is > 7×10^5 m^2. For telescope located about 7kms away from the mountain slope horizontally, the shadow of mountain is about 7° in elevation. In actual conditions the mirror telescope placement the distance till the opposite slope of the gorge is ~ 7 km or ~ 16.5 radiation units of length, that is quite enough for the development of an electromagnetic cascade till the structure characteristic for the rarefied atmosphere. The purpose of observations was revealing of background conditions when anthropogenic sources of light are absent. During 324 hours of observations 5 events were detected which have expected angular characteristics of a light burst of an electron-photon cascade developing within a telescope observation angle. These showers have energy in the range of about 6 - 17.5 TeV. All other 318 events of detection of short-range light bursts in the atmosphere have not a narrow angle light direction and are chaotically distributed along the whole matrix or its part of a light-receiver. These events may be interpreted as a reflection of a Cherenkov burst from a snow mountain slope or as an ionisation luminescence of the atmosphere while an extensive air showers transition within a telescope observation angle.





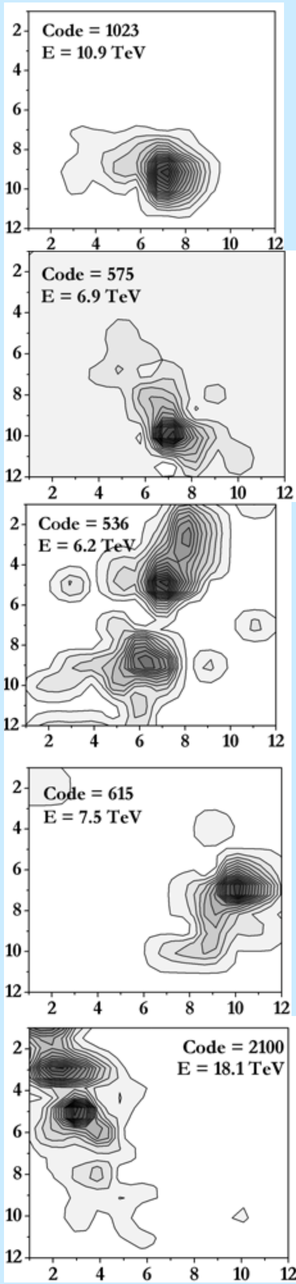
A search for upward UHE neutrinos with SHALON atmospheric Cherenkov telescope

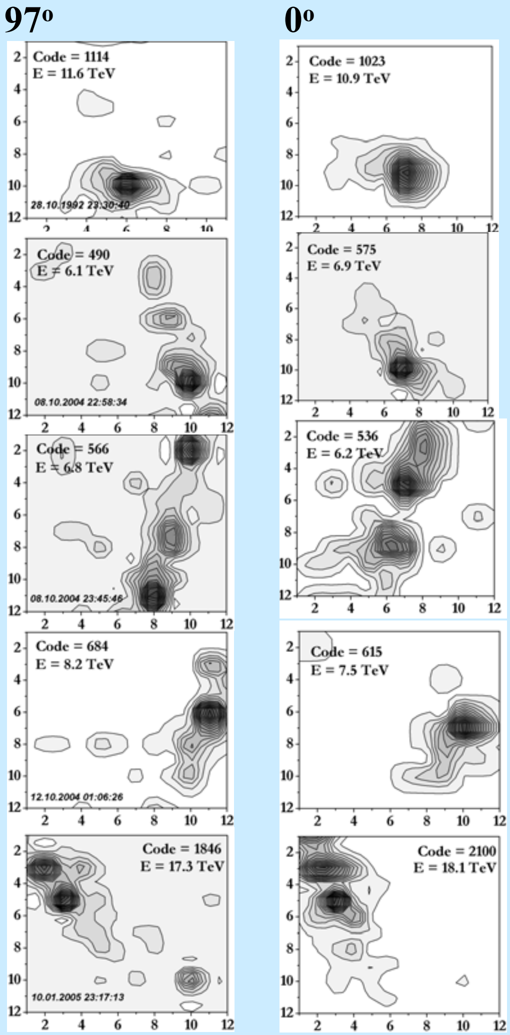
97º



Observations at 97º zenith angle have been done in cloudless nights in absence of artificial lights and dry air. During 324 hours of observation 323 short-range bursts were recorded. The picture of 318 of these is flash that chaotically or smoothly spread along whole the matrix or its part. These events may be interpreted as a reflection of EAS Cherenkov burst from a snow mountain slope or as a ionisation luminescence of the atmosphere if vertical EAS transits within field of view. But 5 events have form characteristics similar to those observed at 0º zenith angle. These cascades look like the usual extensive air showers generated in atmosphere with narrow light shape. The shower energies are in the range of 6 - 17.5 TeV. The background for this events can be some reflections of cosmic ray EAS in the mountain slope. First of all it could be a reflection of showers initiated by particles born in interaction of very high energy cosmic rays and rock matter nucleons. The energy of detected showers is more than 6 TeV. There is no albedo particles of such high energies. One more source of particles with high transverse energy is jet production. The probability of hadronic jet production with energy of observed showers is ten orders of magnitude less than one for detection of shower generated by secondary particles of UHE neutrino interaction. The estimated neutrino event rate is one shower per 100 hours for neutrino of all flavours and fluxes expected by models. It corresponds to rate of ~ 10^{-15} cm^{-2} s^{-1} that is comparable to fluxes of weak gamma-quantum sources presently observed by SHALON.

0º



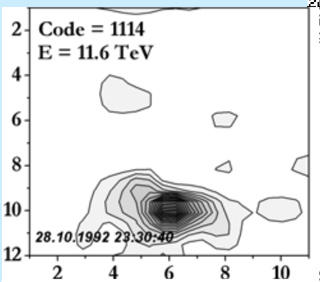


A search for upward UHE neutrinos with SHALON atmospheric Cherenkov telescope

Conclusion

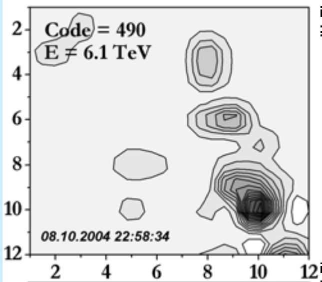
It is supposed to overcome the main difficulty of observation of EAS, generated by neutrino in conditions of high mountainous observations, connected with the small cross section of neutrino-nuclei inelastic collisions. Two facts allow to carry out the search experiments. The hadron cascades with energy > 10^{13} eV are generated by neutrino in the ground of mountain on the thickness <300g/cm^2. The Cherenkov radiation of the hadron cascades will be observed along the direction of neutrino by gamma-telescope placed on the distance about 7kms from a mountain slope in area of more than > 7×10^5 m^2. These cascades look like the usual extensive air showers generated in atmosphere with narrow light shape. Presently, the fluxes of galactic gamma-quantum sources Cygnus X-3, Tycho's SNR, Geminga of <10^{-14}cm^{-2}s^{-1} are observed by SHALON. The appearing of one shower per >100 observation hours is expected if the flux of neutrino from local sources is 10^{-15}cm^{-2}s^{-1}. During 324 hours of observations 5 events were detected which have expected angular characteristics of a light burst of an electron-photon cascade developing within a telescope observation angle.

97°



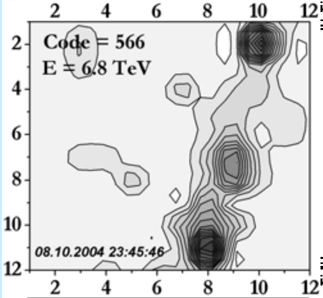
28.10.92
VENT No 1
23:30:38.17

4	2	7	10	11	13	12	12	0	6	7	0
6	1	0	1	5	5	0	1	5	4	3	4
3	3	1	2	2	4	3	5	1	1	7	3
6	7	0	5	9	2	3	1	5	2	1	7
1	2	4	1	17	14	0	5	5	2	3	3
3	4	4	0	5	5	3	7	11	7	5	6
1	1	0	0	4	5	4	9	1	2	1	1
5	4	0	3	2	16	5	1	11	0	7	16
0	4	6	5	20	47	24	12	5	4	3	3
4	6	2	7	23	43	165	71	17	9	17	2
0	0	3	12	1	25	33	14	20	1	2	1
5	0	6	6	12	13	24	1	0	7	6	5



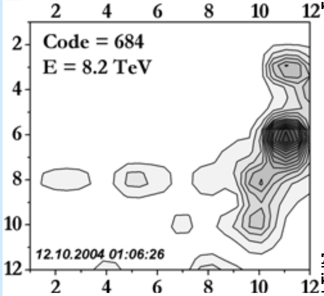
8.10.04
VENT No 1
22:58:38.17

0	0	0	0	0	0	0	0	0	0	0	0
0	0	5	0	0	0	0	0	0	0	0	0
0	6	0	0	0	0	0	25	0	0	0	0
0	0	0	0	0	0	0	23	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	22	36	0	0	0
0	0	0	0	0	0	0	0	0	12	0	0
0	0	0	0	11	5	0	0	14	11	0	0
0	0	0	0	0	0	0	0	50	52	7	0
0	0	0	0	5	0	0	5	8	114	0	0
0	0	0	0	0	0	0	0	0	0	5	0
0	0	0	0	0	0	0	5	7	0	53	0



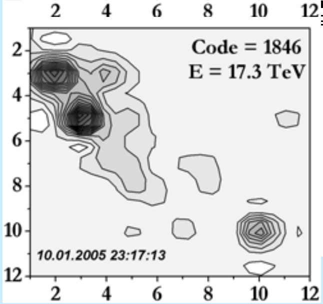
VENT No 4
23:45:46. 1

0	0	0	0	0	0	0	0	0	0	5	0
0	0	8	0	0	0	0	0	0	67	6	0
0	0	0	6	0	0	0	0	0	18	0	0
0	0	0	0	0	0	10	0	8	12	0	0
0	0	0	0	0	0	0	7	10	6	7	0
0	0	0	0	0	0	0	6	17	0	6	0
0	0	6	6	0	0	0	14	42	5	0	0
0	0	0	0	10	0	0	12	37	6	0	0
0	0	0	0	0	0	0	26	0	0	0	0
0	0	0	0	0	0	20	40	17	0	0	0
0	0	0	0	0	0	11	75	0	0	0	0
0	0	0	8	0	11	11	10	0	0	0	0



2.10.04
VENT No 6
1: 6: 7.70

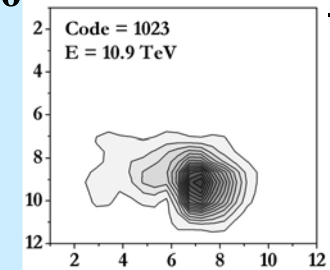
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	48	12
0	0	0	0	0	0	0	0	0	0	13	41
0	0	0	0	0	0	0	0	0	0	21	21
0	0	0	0	0	0	0	0	0	22	134	0
0	0	0	0	0	0	0	0	10	23	74	9
0	5	5	0	15	9	0	11	11	48	18	8
0	0	0	0	0	0	0	0	0	28	7	0
0	0	0	0	0	0	5	0	13	32	0	0
0	0	0	0	0	0	0	0	0	5	0	0
0	0	0	8	0	0	0	21	7	0	0	0



7.01.05
VENT No 2
23:17: 2. 1

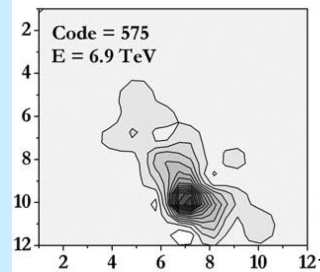
14	17	8	8	0	11	12	11	5	5	0	6
30	0	16	7	0	0	0	0	0	0	0	0
24	246	63	79	23	0	0	0	0	5	0	0
10	68	98	27	11	8	5	0	0	0	0	0
0	7	284	65	45	0	0	13	0	0	18	0
0	10	0	52	23	13	0	0	0	0	0	0
0	9	13	41	43	0	16	19	0	0	0	0
0	0	0	0	41	21	0	19	5	9	13	0
0	0	0	0	0	11	5	0	0	0	0	0
0	0	0	0	16	0	20	5	8	125	8	0
0	0	0	6	0	0	0	0	0	0	0	0
0	0	0	0	6	0	11	12	0	0	0	17

0°



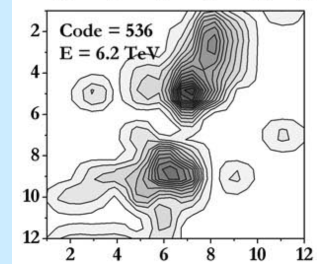
EVENT No 462
1:13:46.33

0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	6	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	9	9	7	12	6	9	0	0	0	0
0	0	6	16	21	37	67	27	8	7	8	0
0	5	12	13	33	44	163	87	20	0	0	0
0	0	11	5	11	12	116	64	13	0	0	0
0	0	0	0	0	8	16	15	0	0	0	0
0	0	0	0	7	8	9	6	0	0	0	0



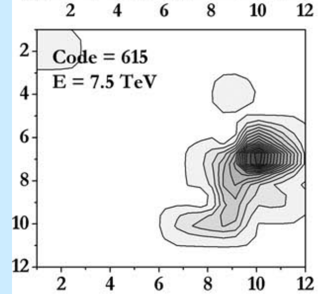
EVENT No 1118
0:37:25.35

0	0	0	0	0	0	0	0	0	0	0	0
6	0	7	9	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	5	0	0	0	0	0	0	0	0	0	0
0	0	0	0	10	0	0	0	0	0	0	0
0	0	0	0	9	7	0	0	0	0	0	0
0	0	0	5	11	0	9	0	0	0	0	0
0	0	0	0	0	25	22	0	5	0	0	0
0	0	0	0	0	15	51	0	0	0	0	0
0	0	0	0	0	0	115	44	10	0	0	0
0	0	0	0	0	0	0	13	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0



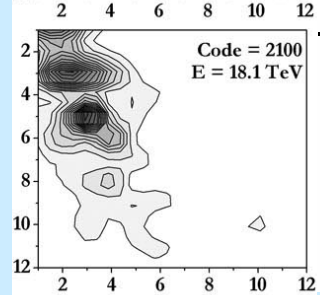
EVENT No 226
2:29:31.91

0	0	0	0	0	0	0	8	0	0	5	0
0	0	0	0	0	0	5	26	11	0	0	0
0	0	0	0	0	0	12	29	11	0	0	0
0	0	0	0	6	8	28	21	9	0	0	0
0	0	8	0	8	11	51	23	0	0	0	0
0	0	0	0	0	0	16	0	0	0	0	0
0	0	0	0	7	0	0	0	0	0	5	0
0	0	0	0	6	28	13	0	0	0	0	0
0	0	7	9	15	34	31	0	5	0	0	0
0	6	5	0	14	6	9	0	0	0	0	0
0	0	0	0	0	9	0	0	0	0	0	0
0	7	7	7	5	5	0	0	0	0	0	0



EVENT No 1788
1:23:46. 6

0	0	0	0	0	0	0	0	0	0	0	0
6	5	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	6	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	43	18	0
0	0	0	0	0	0	0	10	37	103	50	0
0	0	0	0	0	0	0	7	35	20	6	0
0	0	0	0	0	0	0	0	25	8	8	0
0	0	0	0	0	0	11	18	19	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0



EVENT No 318
23: 8:49. 5

161	198	67	7	0	0	0	0	0	0	0	0
34	101	40	12	0	0	0	0	0	0	0	0
47	247	206	93	17	0	0	0	0	0	0	0
13	44	63	24	33	15	0	0	0	5	6	0
25	65	294	60	28	0	6	0	0	0	0	0
9	67	70	119	15	0	0	0	0	0	0	0
7	21	22	28	32	0	8	0	0	0	0	0
7	14	37	60	0	9	5	0	0	0	0	0
0	0	20	23	34	20	10	0	0	0	0	0
5	6	25	12	20	0	5	0	0	20	0	0
0	0	10	8	15	19	7	5	0	0	0	0
0	0	0	0	6	0	0	0	5	0	0	0

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