



## On the nature of particles that produces extensive air showers

### with energy greater than 5 EeV

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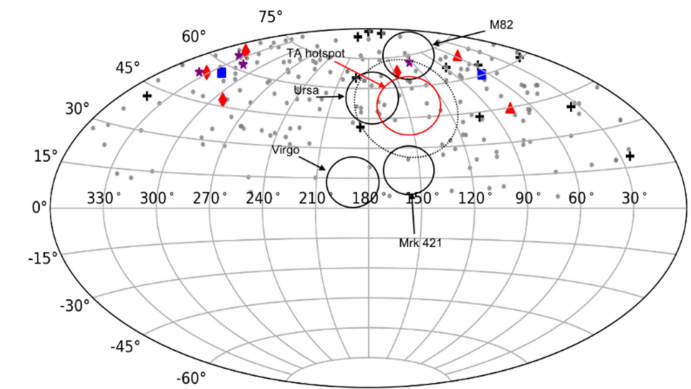


Judging by the analysis of double showers, the nature of the primary particles forming the EAS is diverse. Not all paired events have close declination and right ascension. This could be influenced by uncertainty in locating the shower axis and angles of arrival. In addition, the discrepancy could be explained by the fact that paired showers could have different charges, hence the magnetic field of the shock wave will affect the trajectory of these particles in different ways.

At the same time, there are paired events in which both declination and right ascension are quite close. There are much fewer such events among the selected shower pairs. In figure, diamonds and stars show showers with the closest parameters, but despite this, their galactic coordinates have a significant discrepancy. Experimental data and available active sources cannot say mainly from which region of the celestial sphere the showers come. Some of the events are concentrated near the galactic plane, and some near the supergalactic plane. The absence of active astronomical objects in this region of the celestial sphere does not mean that they are not there. Perhaps we do not know about these sources yet.

Table 1. Pairs of showers.

n/n	Date	$\Delta t$ [h]	$\Delta \lg E$	$\Delta \theta$ [°]	$\Delta \varphi$ [°]	Dec [°]	RA [°]	Dec [°]	RA [°]
1.	18.04.03	12.13	0.03	11.2	148.1	47.7°	293.0°	54.4°	337.4°
2.	02.05.03	07.15	0.08	9.9	137.0	55.3°	332.0°	64.0°	337.0°
3.	31.03.04	01.51	0.01	14.4	16.1	67.7°	146.8°	71.8°	123.0°
4.	22.01.09	11.11	0.01	7.2	86.7	65.9°	141.2°	62.3°	318.2°



Diamonds and stars are showers from the table 1.

Triangles – showers with energy  $E \sim 100$  EeV;

Squares – showers with low muon content;

Crosses – air showers with  $E \geq 10$  EeV registered by radio antennas;

Grey dots – shower pairs with  $E \geq 5$  EeV.