

Cosmic Ray investigations on peak Musala in Bulgaria: A memoir

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Abstract

A very brief historical description of the Bulgarian Cosmic Ray investigations, in the Cosmic Ray Station on peak Musala (2925 m.a.s.l.) is presented. Difficulties of the high mountain measurements that time are mentioned, together with the hard emotional and successful work done by a small staff of young Bulgarian cosmic ray scientists.

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1. Introduction

1957. Just 50 years ago... Two young physicists: B. Betev and S. Kavlakov received their Masters in atomic physics. Their University teacher Dr. L. Mitrani invited them to organize a new laboratory for Cosmic Ray investigations, as a small part of the Institute of Physics of the Bulgarian Academy of Sciences.

Now it is very difficult, even for me, to reproduce the situation in this small East European country. The communists were on full power. In Hungary the insurrection of November 1956 was just suppressed. The leaders in Bulgaria were uneasy. Every wrong word, every connection with the “Decaying West” was suspicious. Not even speaking about the free discussions and change of minds or scientific literature.

That was the time, when we decided to begin with the creation of our own Cosmic Ray Detectors. We needed calibrated tubes and tungsten wires. We needed suitable electronics and relatively stable measuring apparatuses. But generally all that was produced in the “West”.

2. Collaboration and first steps

We understood that all that we could not overcome alone. So we tried a successful step: cooperation with the Hungarian Academy of Science. Why Hungary?

Because: That time the President of the Hungarian Academy of Sciences became Prof. Layos Janossy, well known as scientist, who had made his Cosmic Ray investigations far before the World War II.

Because: The Hungarian colleagues already had a well organized Cosmic Ray Department.

Because: They had better experience in electronics.

Soon we realized how important that cooperation was. From our Hungarian colleagues we received two big boxes of suitable tubes. In a small workshop we successfully converted them in Geiger–Muller counters for the first Bulgarian muon telescope, measuring coming muons under 45° toward the zenith in East and West direction.

Could you imagine the data registration in 1958? Mechanical counter, photographed every hour, signals from pendulum clock, film developing, reading and writing on paper the records.

Could you imagine now electronics based on 1000 radio tubes, changing their characteristics with time?

Could you imagine how often they have to be checked and changed?

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3. On the highest peak in Balkan Peninsula

We understood that with its 450 m above sea level, Sofia was not suitable for continuous cosmic ray measurements. Only 60 km, to the South we had a wonderful peak nearly 3000 ms above sea level with a more wonderful name: Stalin.

Maybe because of that,

Maybe because of the high level connections of Prof. Janossy,

Maybe because in Hungary there are no mountains, and surely because of our enormous enthusiasm, our Cosmic Ray Station was built only for one season on the highest peak on the Balkan Peninsula (Fig. 1).

So at the beginning of 1960 we had a 100 m² laboratory surface, under an 8 gr/cm² roof, situated at nearly 3000 m above sea level. We had enough electric power. We had two new technicians. We had a wonderful mountain overview (Fig. 2).

But to reach peak Musala we had to walk on foot 20 km. There was no road, and even no path to this place. Only in summer time an old type lift could supply materials and foods. And on the peak, the winter is a real one (Fig. 3).

The temperature: -10 to -30°C . The pressure: 695–710 mb. The wind: 10–30 m/s. The average snow: 3 m.

The maximum measured snow after the storm on May 14, 1965 was 8.5 m.

To get on Musala in winter time was risky; it needed enormous efforts.

To go downhill by ski alone on the 70% slope was very dangerous.

On January 14, 1966 one of our technicians was killed by an avalanche. Every one of us had at least ten minor, or not so minor, injuries.

But we were young. And we did not wait even for the walls to dry and the snow to melt; we began the work on Musala Cosmic Ray Station on the first days of January 1960.

4. First organized Cosmic Ray meetings

Well, we did it. The measurements on the peak were in progress. And we were already noticed. We were eager to exchange experience with other colleagues, to show them our new High Mountain Cosmic Ray Station. So in September 1961 we organized in Sofia the Seventh East European (and First Bulgarian) Cosmic Ray Conference.

Still there were no results from the peak. But we presented two talks, based on our basic measurements in Sofia (Kavlakov et al., 1960; Mitrani et al., 1960). Our presentations were in English Language, highly appreciated by our Hungarian colleagues, but in contradiction with the official Bulgarian rules in those years.

That conference was a success for us – the beginners in science, younger than 30 years, honored with the presence of all known cosmic ray specialists from Eastern Europe and from the Soviet Union.



Fig. 1. Bulgarian Cosmic Ray Station on peak MUSALA (2925 m above sea level) is just built.

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