# Lomnický štít - The High Tatras - Slovakia Slovak Academy of Sciences

Lomnický štít (2634 m above sea level, coordinates 49.40 N. 20.22 E) is a suitable location for high altitude solar (September 1962) and cosmic ray (January 1958) observations. The meteorological station and public cable car are also located at the Štít since 1940.

## Solar observations



The corona is the outermost part of the solar atmosphere that extends very far beyond the Earth's orbit. Solar wind particles that permanently flow from the corona into heliosphere 'drug' magnetic fields from the solar surface, and both, these magnetic fields and solar wind particles influences the Earth's magnetosphere, ionosphere, auroral electric streams, etc. Apart of it, flares, eruptive prominences and coronal mass ejections are responsible not only for the magnetic storms on the Earth, cosmic ray variability, but their high energetic particles can damage arrays aboard satellites, space probes, astronauts on the Earth's orbit, electric systems on the Earth, etc. The solar corona is highly structured, dynamic, rare and extremely hot, of about 2 million degrees. Its observation outside of the solar eclipse is extremely hard and needs some special equipments, and high-mountain location.

### Cosmic ray measurements

High energy particles originated from outer space (cosmic rays) strike the Earth from all directions. Measurements of the cosmic ray intensity on Lomnický Štít commenced in January 1958 in frame the International Geophysical Year. The monitoring system was several times improved. From December 1981 until now the 8-tube NM64 works continuously in the small house on the roof of the main building at Lomnický Štít. The average counting rate of the NM is now ~ 1,6.10<sup>6</sup> per hour. At present 1min resolution data are available in real time along with other data

The white light solar corona as observed during solar eclipses.





#### including archive of hourly means at: http://neutronmonitor.ta3.sk



The neutron monitor is placed in the small measurement building on the roof of the main one at Lomnický Štít. There are used 8 proportional counters of the type SNM-15.

Cosmic rays have both the direct and indirect relations to Space Weather. The first one is related to the radiation damage, the second one is based on the fact that in several cases a couple of hours before the onset of geomagnetic storm the variability and anisotropy of primary cosmic rays is changed.

Twin coronagraphs located at the Lomnický štít coronal station. Diameter of a lens is 20 cm, the focal length 400 cm



Eruptive prominence (cool material in the corona), called 'Frozen Bird'.

The Sun-nearest star is a magnetically variable star with a periodicity of an 11years in average. The total solar irradiance, occurrence of dark features on the solar surface – spots, intensity of the emission coronal lines (see left Figure), the 2800 MHz radio flux, the X-ray emissions etc. are followed by this variability.







One of the strongests decreases of cosmic rays observed due to the changed conditions in interplanetary space. The decrease was observed also as reduction of the radiation dose measured on the airplane in central and south-east Europe.



The strongest solar cosmic ray effect was observed in September 1989 (left panel). A recent ground level event was recorded with 1 min resolution in January 2005 (right panel).

Continuous cosmic ray measurements are running by the Institute of Experimental Physics of Slovak Academy of Sciences in Košice (its Department of Space Physics, http://space.saske.sk).

Lomnický štít (left) and Kežmarský štít (right) as seen from Tatranská Lomnica

#### **Copyright:**

Astronomical Institute, Slovak Academy of Sciences, 05960 Tatranská Lomnica, Slovakia V.Rušin (vrusin@ta3.sk) and M. Minarovjech (milanmin@ta3.sk) Institute of Experimental Physics, Slovak Academy of Sciences, Watsonova 47, 04001 Košice, Slovakia K. Kudela (kkudela@kosice.upjs.sk) and I. Strhárský (strharsk@saske.sk)

The Sun (SOHO/ESA/SOHO)

