

The study of atmospheric effects on cosmic ray muons in the Low Background Laboratory for Nuclear Physics at the Institute of Physics Belgrade

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Galactic cosmic rays are being modulated in the heliosphere by different processes on the Sun. Upon arriving at Earth, they interact with nuclei in the atmosphere and produce secondary cosmic rays. Changing conditions in the atmosphere affect the propagation of secondary cosmic rays, especially the muon component. To increase the effectiveness of ground-based muon detectors these atmospheric effects need to be decoupled from non-atmospheric ones, and corrected for. To this end, in the Low Background Laboratory for Nuclear Physics at the Institute of Physics Belgrade, we are using several existing techniques but have also developed two new empirical methods for modeling and correction of barometric and temperature effects on cosmic ray muons. Newly developed methods proved to be equally or more effective than the most widely used ones. Such results allow for more precise study of solar modulation and more reliable long term monitoring of galactic cosmic ray flux, and could provide further insight into the relationship between atmospheric parameters and propagation of secondary cosmic rays in the atmosphere.