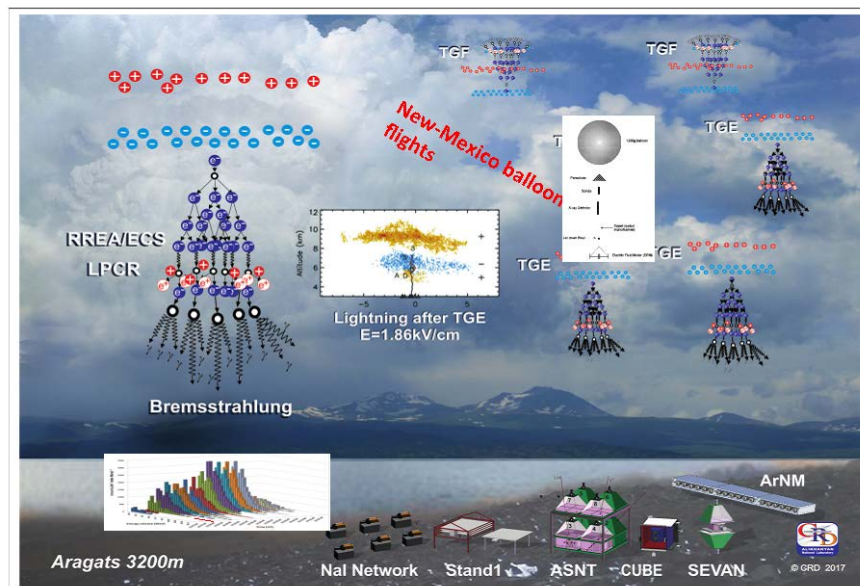


Russian Science Foundation Supports a Research Project Proposed by Russian and Armenian Scientists

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Lightning initiation by the Runaway Breakdowns also known as Runaway Relativistic Electron Avalanche cascades initiated in the thunderstorm atmosphere

The Russian Science Foundation sponsored a research project competition with the aim of funding the best. Winners were announced at the end of March 2017. The project **“Comprehensive Research of High-Energy Particles Sources and Powerful Ultra-High Frequency Radiation”** proposed by Russian and Armenian scientists was among the winners. This project will bring together three research teams from Russia and Armenia: Space Research Institute and Moscow, Institute of Applied Physics of the Russian Academy of Science and Yerevan Physics Institute. All three of these organizations have extensive experience and capabilities to solve complex problems in high-energy and atmospheric physics.

The research topic is about the enigmatic Terrestrial Gamma Flashes (TGF) detected by orbiting gamma ray observatories, recently discovered Thunderstorm Ground Enhancements (TGE), and super bursts of high-frequency radiation sources. There are many types of lightning strikes. The lightning strike called a Narrow Bipolar Event (NBE), occurs within the same cloud, between the positive and negative charges accumulated at opposite ends of same cloud and is responsible for significant charge redistribution within the cloud. The NBE occurs within 10– 20 millionth of a second, and an associated process emits irregular bursts of intense radio noise, fading at shorter timescales, sporadically during the charge transfer.

The sources and generating mechanisms of these phenomena have not yet been fully understood and firmly established, though they are investigated by many research groups worldwide.

The Russian and Armenian researchers plan to use the existing unique infrastructure of Mt. Aragats high altitude cosmic ray research center to conduct their experimental studies. The center includes networks of particle detectors, sensors of electric and magnetic fields, and

automated weather stations. The data on observations of intense bursts of high-frequency radiation during thunderstorms gathered by the satellite "Chibis-M" from 2012 to 2014 will also be analyzed and correlated or combined with the data from Mt. Aragats to better understand these mysterious phenomena.

Another goal of the experiments is to provide a benchmarking data for the development of realistic theoretical models of lightning initiation, transition phases, and their differentiation.

Thus, the project will join the experimental data obtained in the course of terrestrial and satellite experiments, theoretical studies of powerful natural sources of high-energy particles and ultrahigh frequency radiation in the atmosphere – providing a unique perspective on the subject.