Brief information about the project

Title	AP22683924 «Study of the parameters of extensive air showers with high time resolution detectors»
Relevance	The study of delayed particles in extensive air showers (EAS) is one of the most intriguing areas of modern astrophysics and cosmic ray physics. These particles may not only indicate the presence of anomalous phenomena in the Earth's atmosphere but also necessitate a revision of existing physical models. Current theoretical approaches are unable to explain the multimodality of EAS fronts, which is especially relevant in the context of hypotheses about the non-nuclear origin of primary cosmic particles. The development of detectors with high temporal resolution will enable the acquisition of more accurate data on shower parameters, including arrival angles and front delay times. This will significantly enhance our understanding of the interaction between cosmic rays and the atmosphere and may lead to the discovery of new physical effects.
Goal	In this study, it is proposed to develop a system of high-time resolution detectors (5-6 ns) to ensure the accuracy of determining the extensive air showers arrival angles and the delay time of the shower fronts.
Tasks	Creating a detector layout with high time resolution; Installation of the detector system based on the Tien Shan High-altitude scientific station, at the level of 3340 m above sea level; Development and compilation of a software algorithm for controlling the installation; Modeling the distribution of EAS on the CORSIKA package; Processing of the measurement results of the EAS shower disk; Determination of the parameters of extensive air showers on the Chronotron installation.
Expected and Achieved Results	Detector layout with high time resolution will be created; Detector system based on the Tien Shan high-altitude scientific station, at the level of 3340 m above sea level will be installed; Software algorithm for controlling the installation developed and compilated; The distribution of EAS on the CORSIKA package will be modeled; Measurement results of the EAS shower disk will be processed; The parameters of extensive air showers at the Chronotron installation will be determined. For the entire period of project implementation at least 2 (two) articles will be published in journals from the first three quartiles by impact factor in the Web of Science database or having a CiteScore percentile in the Scopus database of at least 50.
Names and Surnames of Research Group Members with Their Identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and Links to Corresponding Profiles	1) Baktoraz Aliya, h-index: 1 ORCID: 0000-0002-5103-8397, Scopus Author ID: 57216946672 2) Mukhamejanov Yerzhan, PhD, h-index: 6 ORCID: 0000-0002-9064-6061, Scopus Author ID: 57200406677
Publications list with links to them	-
Patent information	-