pecially when we consider its low cost as compared to accelerator experiments, must be characterized as promising and necessary.

V. V. Avakyan, A. Ts. Amatuni, T. S. Asatiani, A. D. Erlykin, A. K. Kulichenko, É. A. Mamidzhanyan, S. G. Matinyan, S. I. Nikol'skiĭ, V. A. Romakhin, and E. I. Tukish. *Plan for an experiment to study hadron collisions at energies of 10^3–10^6 TeV.* The experimental hadron-research installation (ANI) is designed to cover a broad range of primary cosmic-ray nucleon energies: 10^3–10^6 TeV. The lower limit of this range is dictated by past experiments, the existence of other scientific facilities, and, most importantly, by experiments being planned for the next few years and beyond with colliding proton-antiproton beams, with particle energies of 0.27 to 3 TeV in each beam.

The upper limit of the energy range to be spanned in this hadron-interaction experiment is determined by the energy spectrum of the primary cosmic radiation and the realistic effective areas of the detectors used in the system.

The nature of cosmic-ray experiments on the one hand and the complexity of the multiple-production event to be studied on the other make it urgently necessary to consider the information yield of the experiment. This is not to question the possibility of a relatively large information yield of this experiment as compared to others, but to face the task of securing, in a single experiment, the most complete information accessible to contemporary techniques on multiple-generation processes at 10^4–10^6 TeV.

The solution of this problem is to be sought in a complex approach to the recording of cascade showers and groups of high-energy γ quanta, electrons, hadrons, and muons. The facility can be divided into three sections on the basis of the criteria used to choose the physical quantities for recording and subsequent processing (see figure).

Firstly, all extensive air showers with primary energies above $2 \cdot 10^3$ TeV are recorded as their cores pass through x-ray-emulsion chambers combined with an ionization calorimeter, area 1600 m^2, at the center of the installation. The possibility of studying composition and structure of the cores of EAS with primary energies above 10^4 TeV makes this facility unique.

Secondly, all groups of γ quanta and electrons or hadrons with 10-TeV total energies are recorded. Analysis of these groups at the high spatial-energetic resolution of the x-ray-emulsion chambers, in combination with information on the total energy flux at the observing level (ionization calorimeter) and the energy of the primary particle (EAS), has hitherto been carried out only for methodological purposes.

Thirdly, high-energy muons generated in inelastic collisions of hadrons and nuclei at energies above 10^3 TeV are recorded also with simultaneous information on the entire nuclear cascade in the atmosphere.

The above selection criteria exhaust all the possible results of incidence of primary protons and nuclei with energies above 10^3 TeV at the top of the atmosphere. However, a wide variety of narrower samples of events of interest can be taken during later statistical computer processing. All recording and processing functions will be automated, and the results stored in data-bank form. The computer will also make systematic quality-control tests of the performance of the numerous and varied modules of the detection system (see Fig. 1).

In conclusion, we list the parameters and characteristics of the inelastic collision event between hadrons and nuclei of air atoms that can be investigated, directly or indirectly: effective cross section for inelastic collision, multiplicity and composition of secondary particles, energy spectrum of secondary particles (fragmentation part), inelasticity coefficient for nucleons, secondary-particle transverse-momentum distribution, and correlation between parameters of the multiple-generation event.

Translated by R. W. Bowers