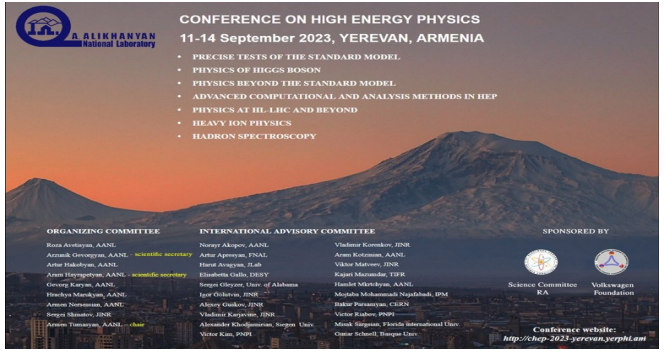
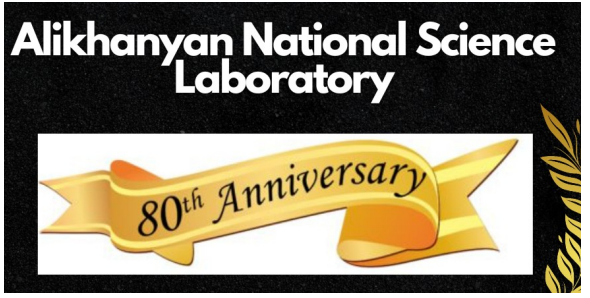


G. Karyan (AANL)



Conference on High Energy Physics

September 11-14,Yerevan, Armenia

G. Karyan
(AANL)

A. ALIKHANYAN National Laboratory
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Alikhanyan National Science Laboratory
80th Anniversary

Conference on High Energy Physics **September 11-14,Yerevan, Armenia**

Alikhanyan National Science Laboratory

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The Yerevan Physics Institute was founded in **1943** on the basis of cosmic ray studies on the mountain of Aragats by brothers Abraham Alikhanov and Artem Alikhanian.

A. ALIKHANYAN National Laboratory

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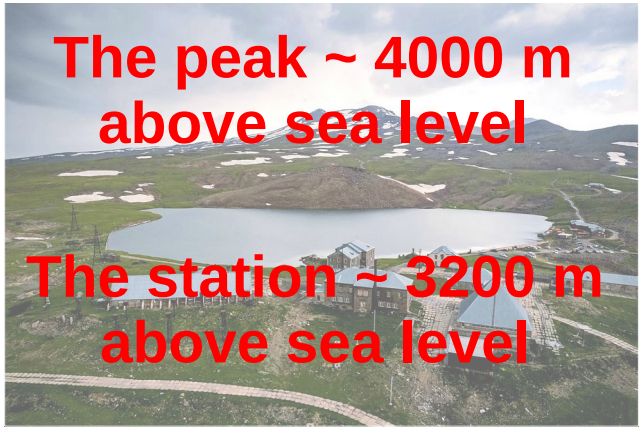

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CLASSIFICATION CONFIDENTIAL **CONFIDENTIAL**

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

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SOURCE Obs!, No 2, 1950.

ATOM BOMB PLANT IN SOVIET ARMENIA

According to many reports, the production of atomic bombs in the Soviet Union is under the supervision of the chief of the secret police, Lavrentiy Beriya, who is also the chairman of the "Secret Committee for the Production of Atomic Weapons." Stalin has given him unlimited freedom of action, ordering that all of Beriya's demands for labor, money, machinery, etc., are to be met immediately.

The Politburo originally intended to produce atomic weapons serially by 1947, utilizing captured German specialists and secret information from the US and Canada. Molotov confirmed this in a speech in Moscow on 6 November 1945.

The Soviet experts required, first, many powerful electric plants for the various production processes. All of the "atomic cities" built in great haste in the Urals near Chelyabinsk and in Western Siberia, southeast of Omsk ("New Germany"), and in Tuva Autonomous Oblast (the upper course of the Yenisey) proved unsatisfactory because of the topography which was very unsuitable for hydroelectric power plants. Beriya's final choice was Armenia.

https://www.cia.gov/readingroom/docs/CIA-RDP80-00809A000600320186-0.pdf

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80th Anniversary

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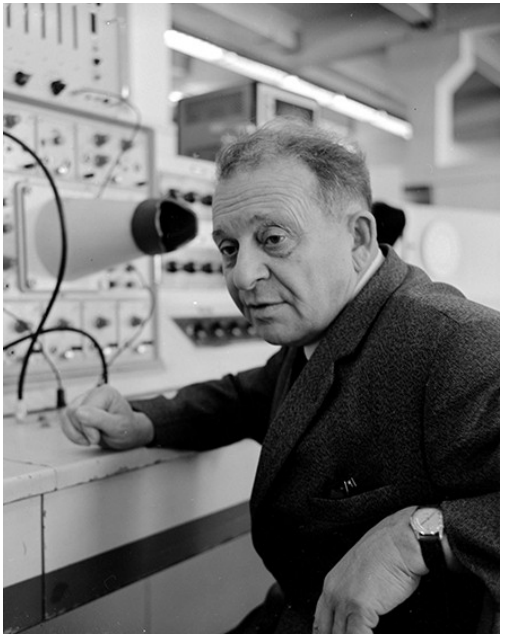

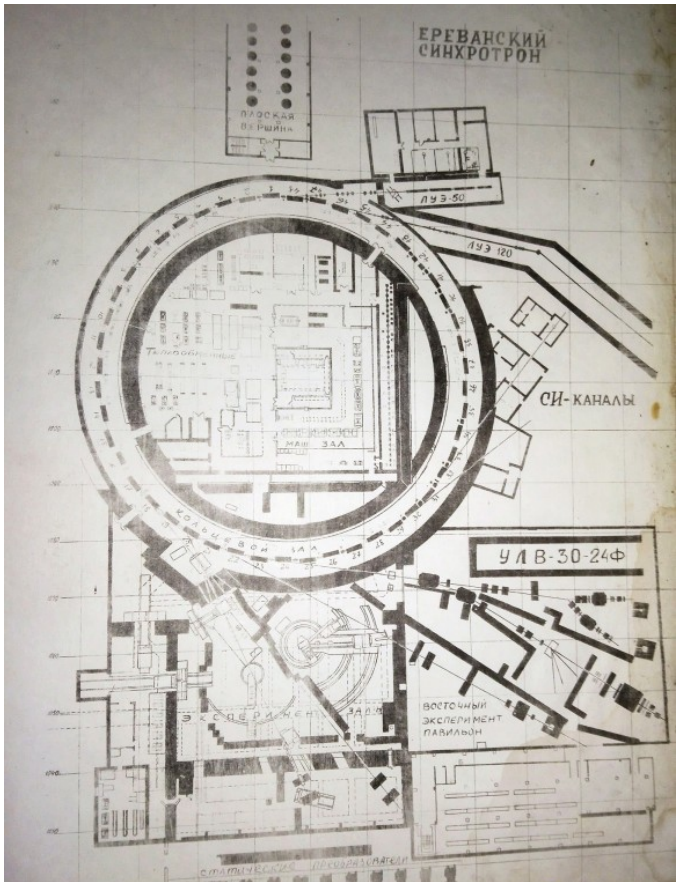

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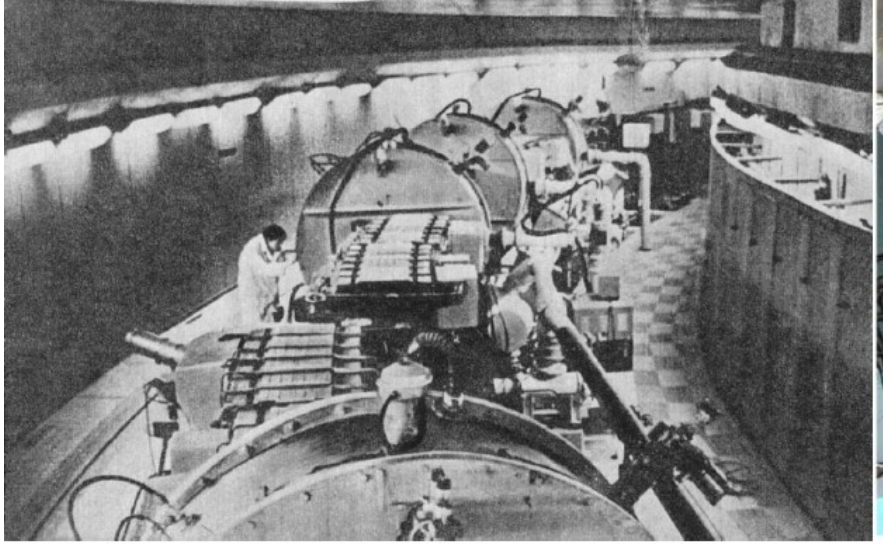
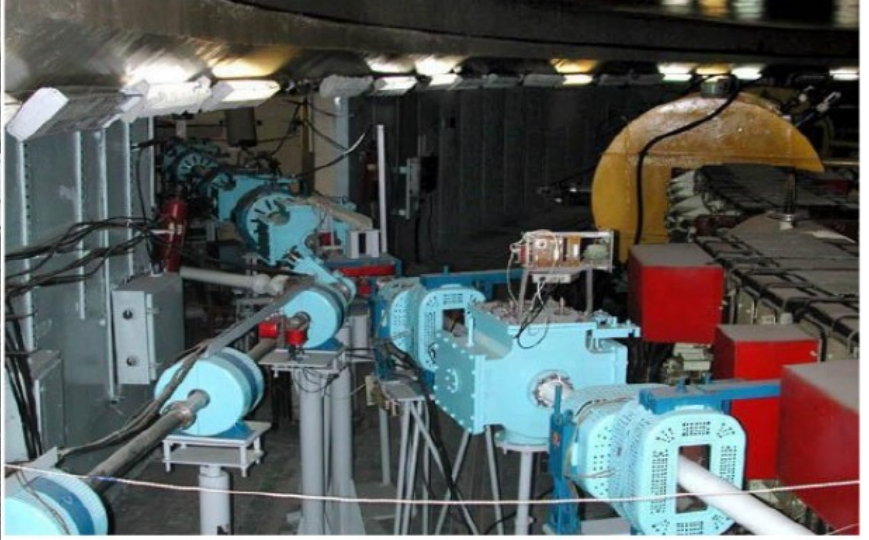
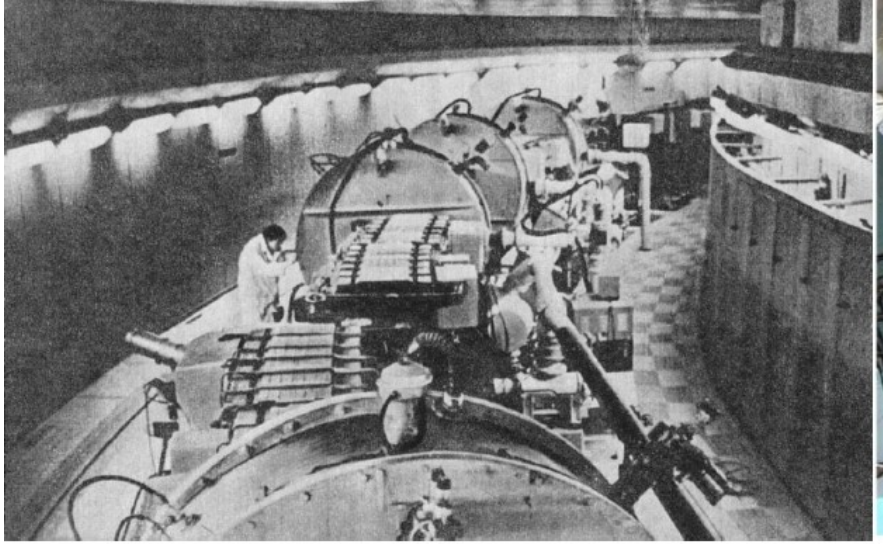
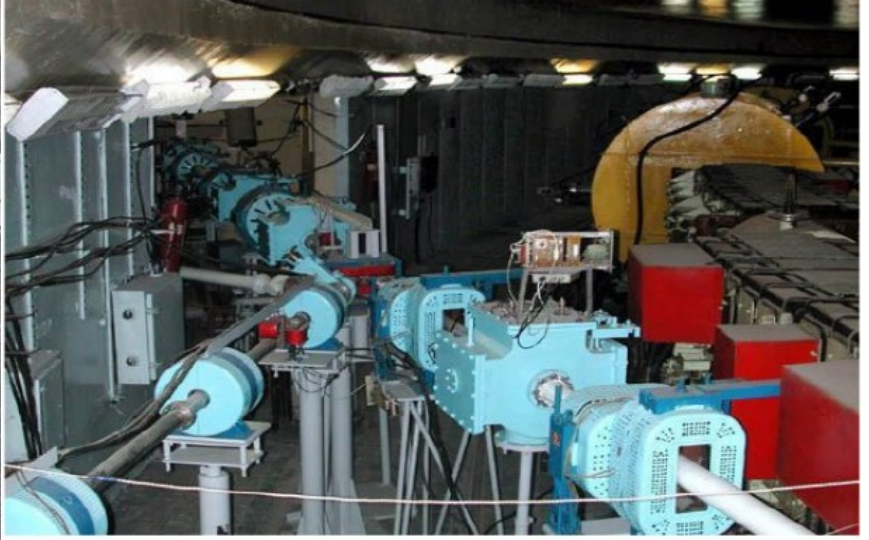
Conference on High Energy Physics September 11-14,Yerevan, Armenia





- ✔ *strong tradition in nuclear and high energy particle physics*
- ✔ *6 GeV electron beam accelerator (since 1967)*
  - first experimental evidence of existence of transition radiation in optical and X-ray regions





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ЕРЕВАНСКИЙ ФИЗИЧЕСКИЙ ИНСТИТУТ

ЕФИ-ТФ-13(70)

THEORETICAL FOUNDATIONS OF TRANSITION RADIATION

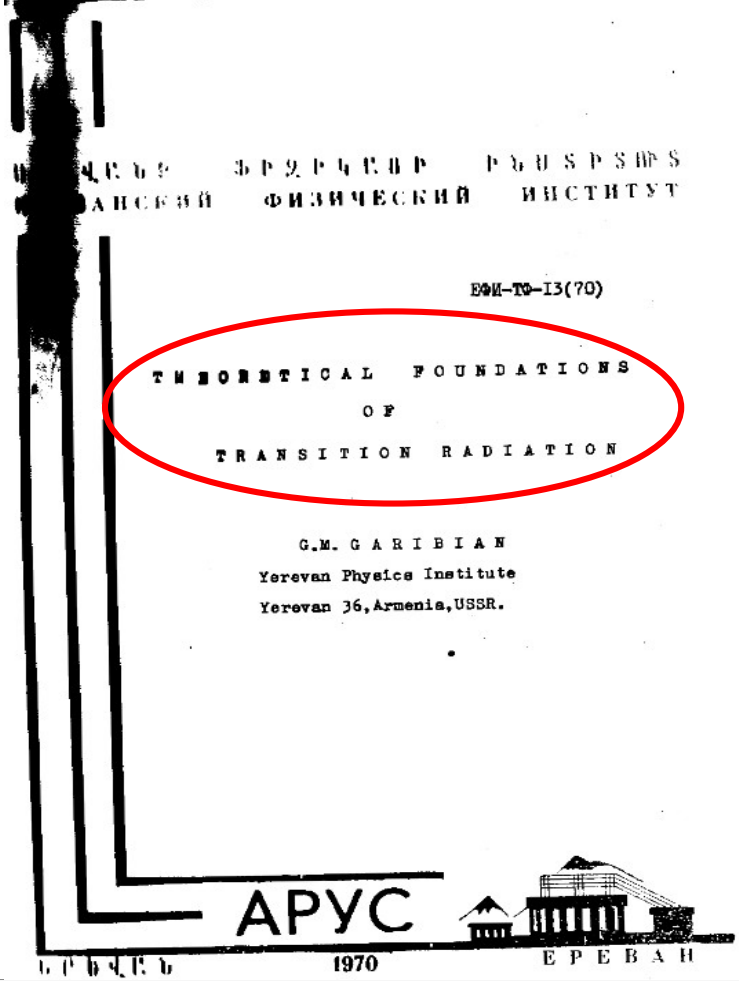
G.M. GARIBIAN
Yerevan Physics Institute
Yerevan 36, Armenia, USSR.

АРУС
1970 ЕРЕВАН

INTRODUCTION

In 1946 Ginzburg and Frank /1/ predicted that a uniformly moving charged particle can emit radiation when passing from one medium to another. This theory established the existence of a new type of radiation, referred as transition, which can be generated at any given velocity of a moving charged particle. Another significant property of this radiation lies in the fact that if one of the media is vacuum, the transition radiation carries an "impression" of the particle field in vacuum, and in particular, a dependence of this field on the particle energy is obtained. In this case it is of great significance that the above dependence of the transition radiation on the particles energy, unlike the one in Cerenkov radiation, does not saturate at large particle energies. As it was noted in Frank's Nobel lecture /2/, for high energy particles this property is very attractive and in recent years it has given rise to a large number of theoretical and experimental studies in transition radiation.

- first experimental evidence of existence of transition radiation in optical and X-ray regions



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OF
TRANSITION RADIATION

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АРУС

1970 ЕРЕВАН

The possibility of experimentally detecting X-ray transi - tion radiation and its utilisation in high energy physics was suggested by Alikhanian in 1960, where a proposed experimental set up was also given[51]. Later, X-ray transition radiation produced by ultra-relativistic particles was observed[52,53], according to the earlier suggested method[51]. X-ray transition radiation was detected by means of a germanium detector[54], and also by means of CsI crystals[55]. Alikhanian, Lorikian et al. observed X-ray transition radiation using a streamer cham- ber[56], where the dependence of the number of quanta on the particle's energy proved to be linear.

51. A.I. Alikhanian, F.R. Arutunian, K.A. Ispirian, M.L.Ter.Mi- kaelian. JETP 41, 2002 (1961).

56. A.I. Alikhanian, K.A. Avakian, G.M. Garibian, M.P.Lorikian, K.K. Shikhliarov. Izv. Akad. Nauk Arm. SSR, Fizika 5, 4, (1970), Phys. Rev. Lett. 25, 635 (1970).

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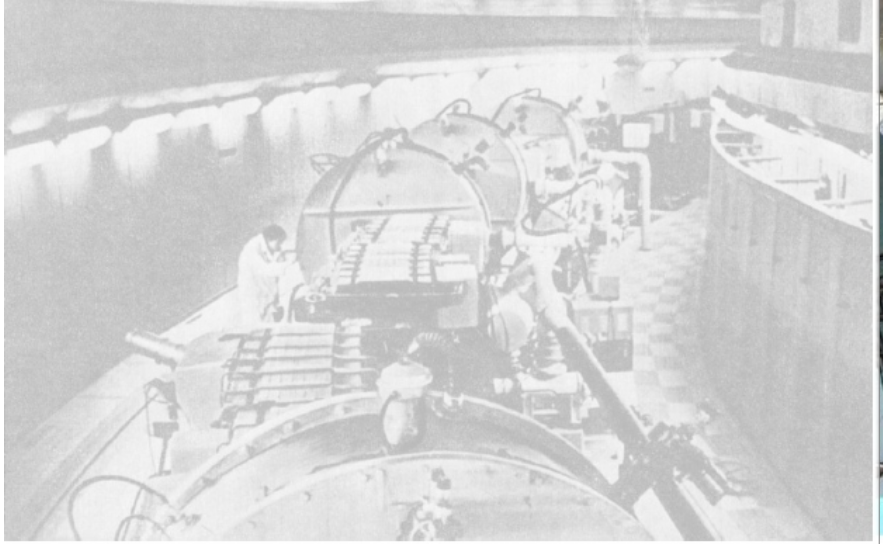


- ✔ *strong tradition i*
  physics
- ✔ *6 GeV electron b*
  - first experimental e
    optical and X-ray re

- ✔ **75** *MeV electron LINAC,* **18** *MeV proton Cyclotron*

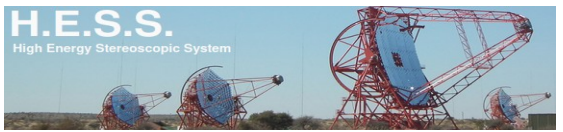
DESY.

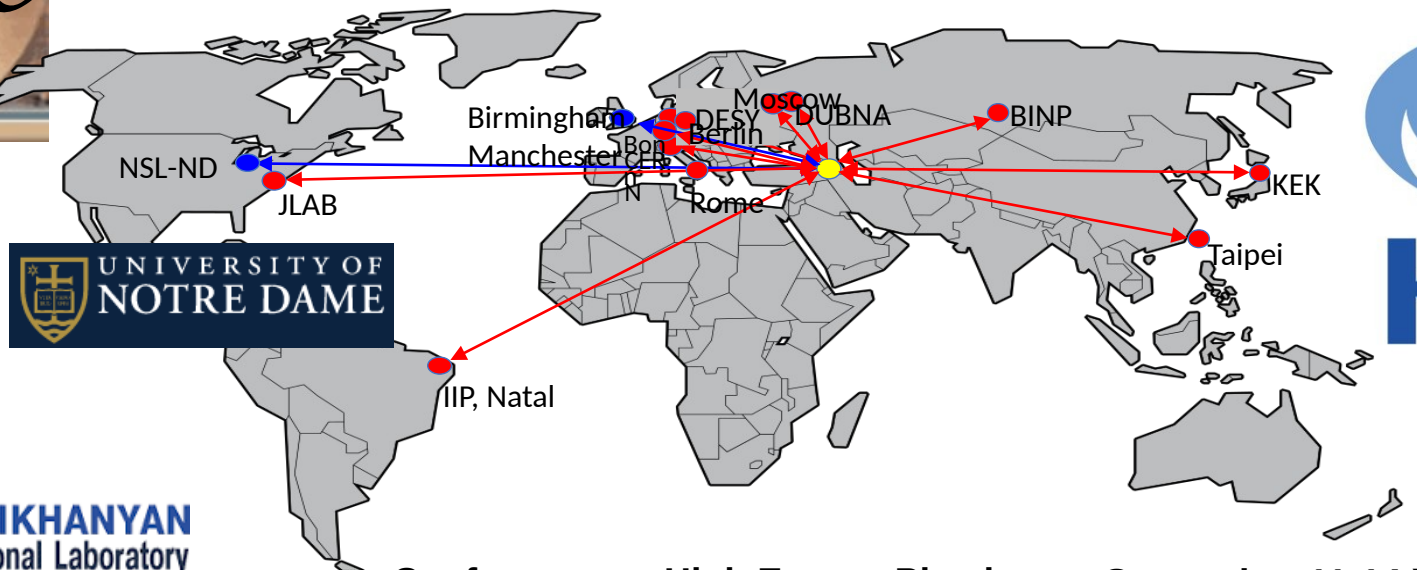
Jefferson Lab

DUNE DEEP UNDERGROUND NEUTRINO EXPERIMENT

CERN

JOINT INSTITUTE FOR NUCLEAR RESEARCH





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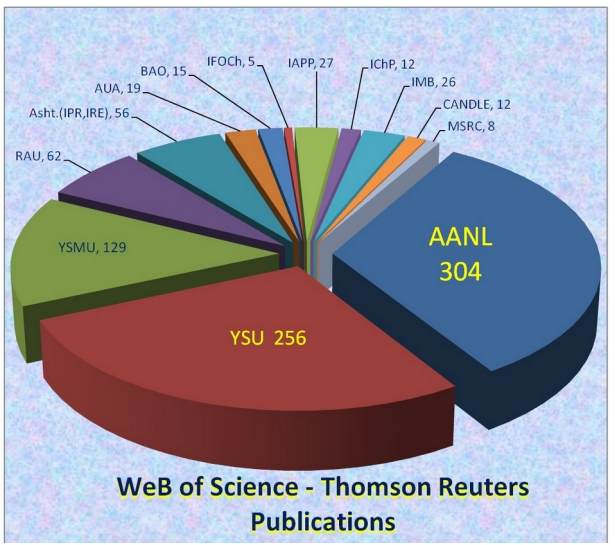
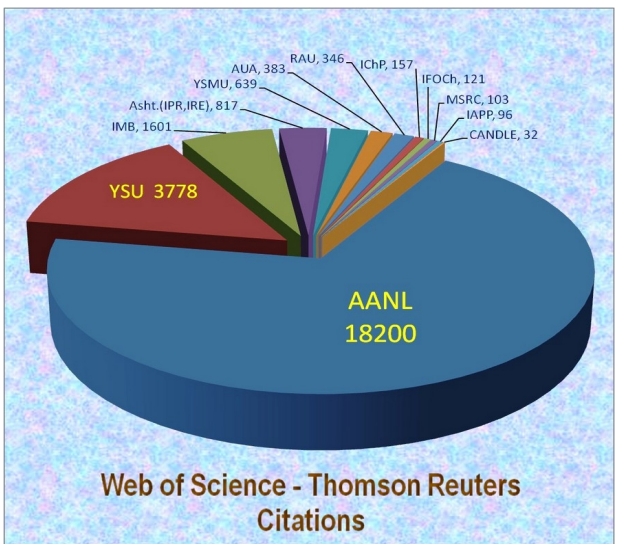
Scientific achievements of A. Alikhanyan National Science Laboratory (AANL)

AANL scientists are publishing about **300** articles in peer reviewed journals per year according to the Thomson Reuters Web of Science with over **18,000** citations to those publications.





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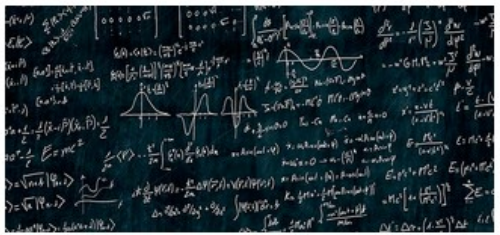
Science at AANL

Alikhanyan National Science Laboratory

80th Anniversary

EXPERIMENTAL PHYSICS DIVISION



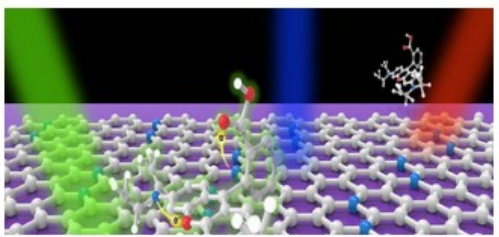
MATINYAN CENTER FOR THEORETICAL PHYSICS

CENTER FOR COSMOLOGY AND ASTROPHYSICS

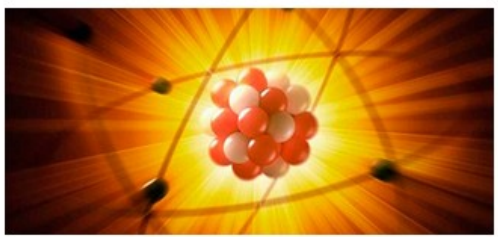
QUANTUM INFORMATION AND QUANTUM TECHNOLOGIES

COSMIC RAY DIVISION

COMPUTATIONAL PHYSICS AND IT DIVISION



APPLIED PHYSICS RESEARCH DIVISION



ISOTOPES RESEARCH AND PRODUCTION DEPARTMENT

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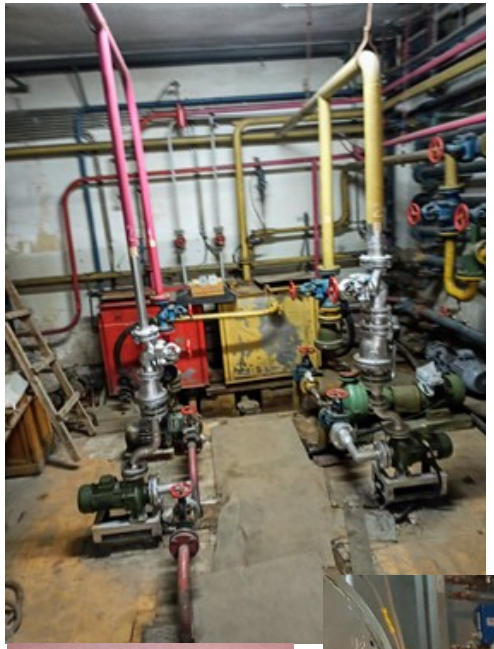
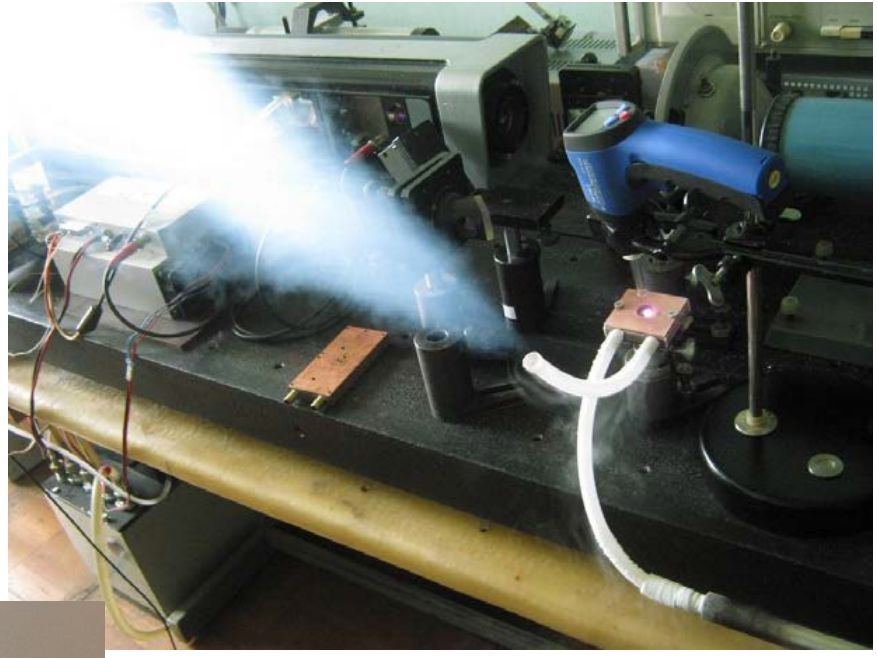
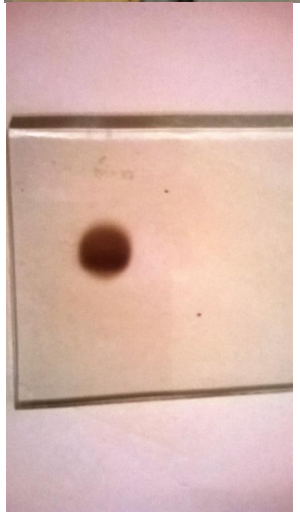
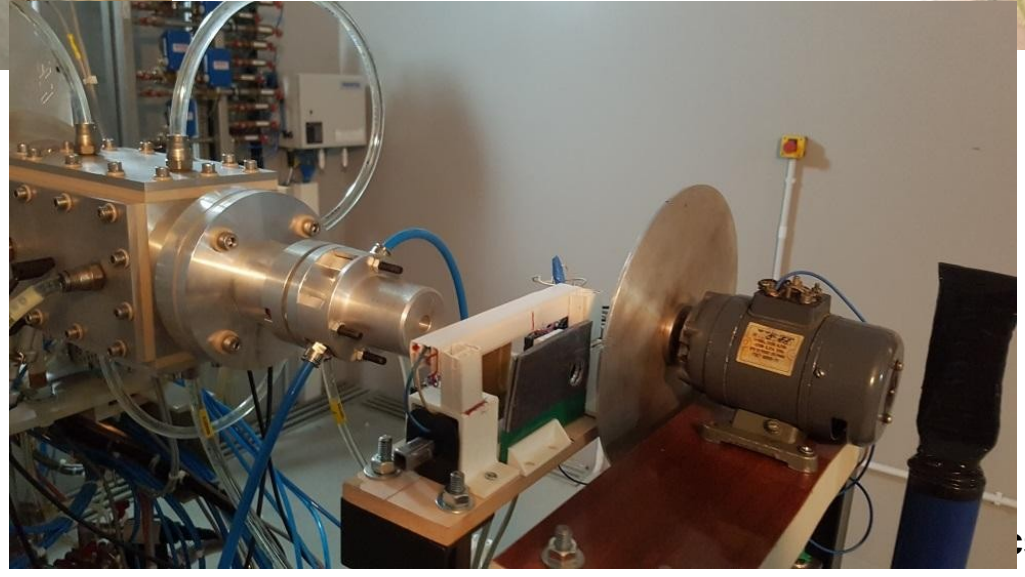


Local experiments on electron and proton accelerators.





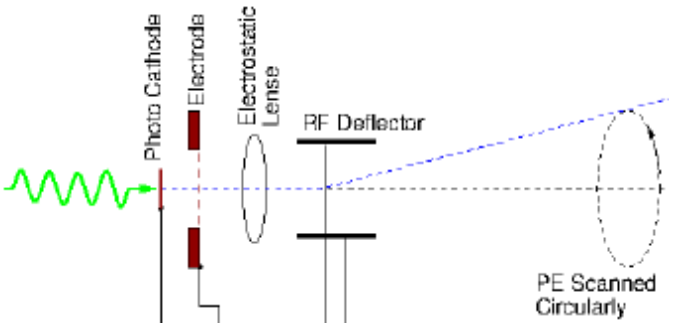


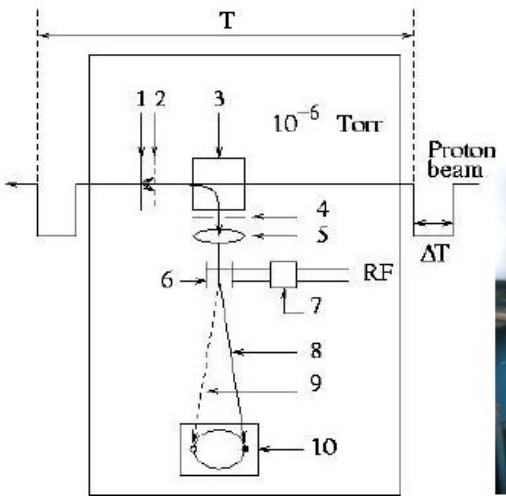
Experimental setups developed at AANL

Radio Frequency Time Measuring Technique

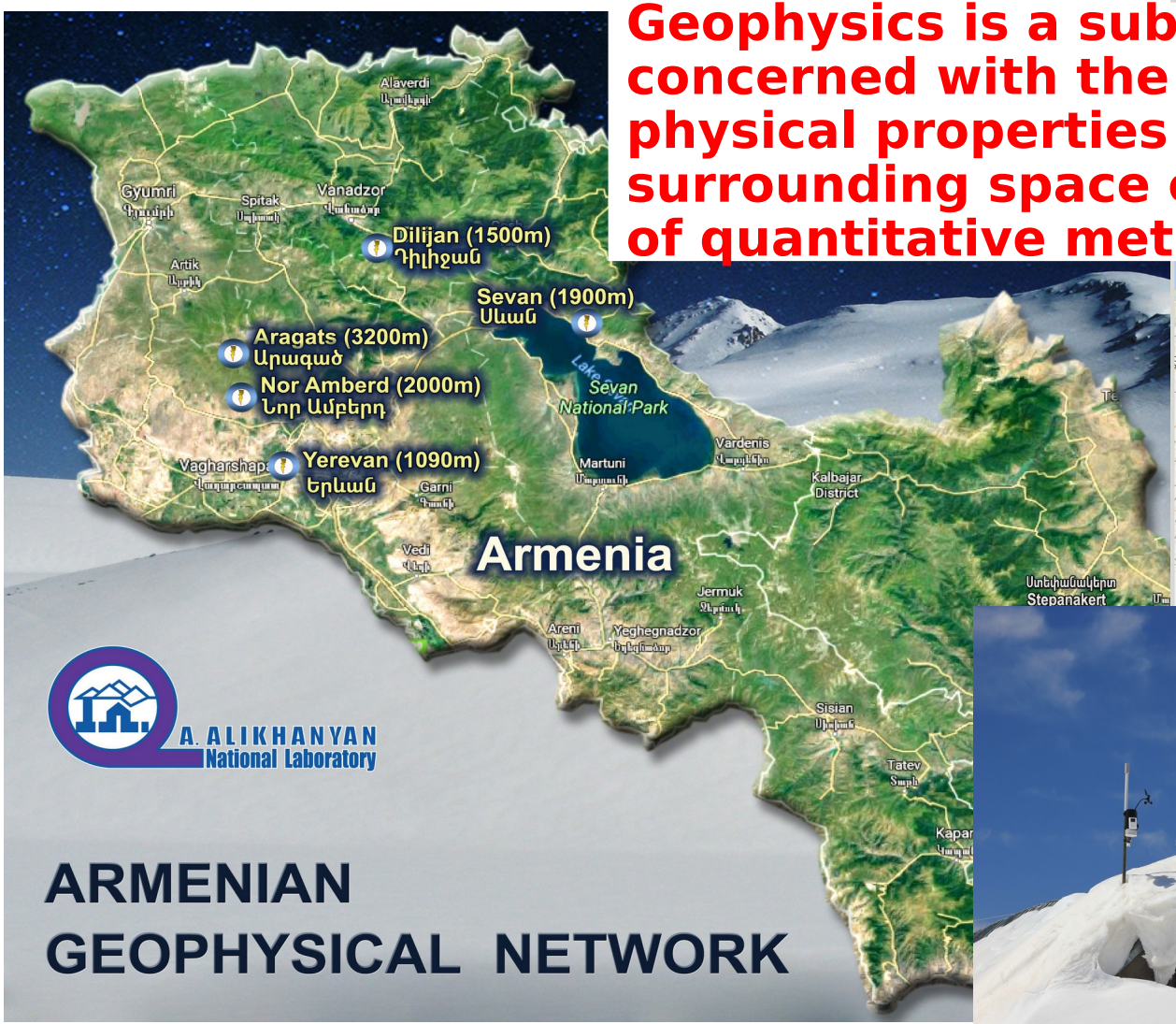
Light detection and ranging system

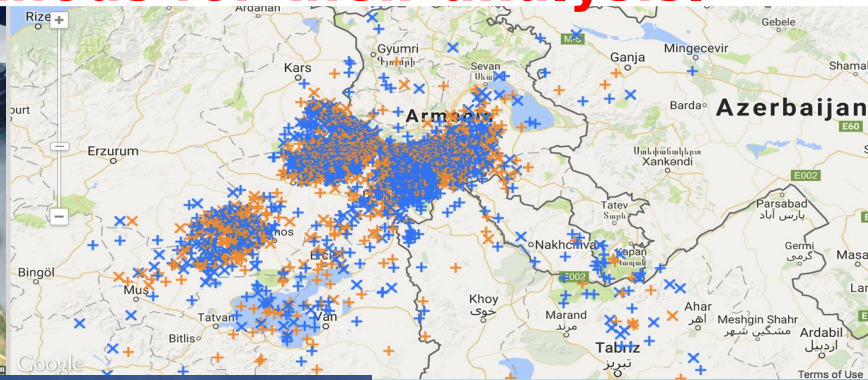
SEVAN detector

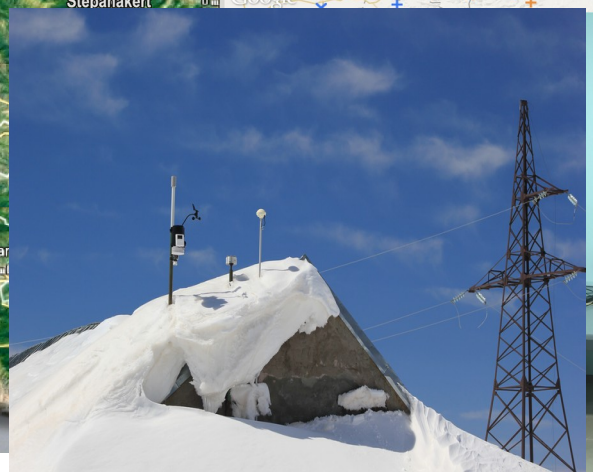




Geophysics is a subject of natural science concerned with the physical processes and physical properties of the Earth and its surrounding space environment, and the use of quantitative methods for their analysis.

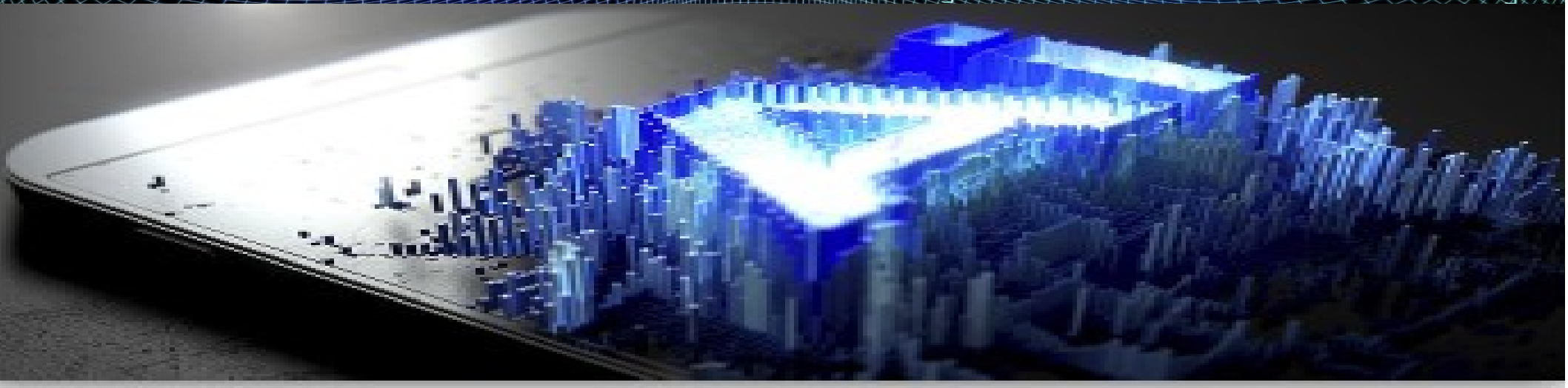


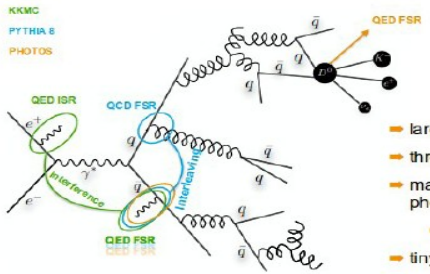




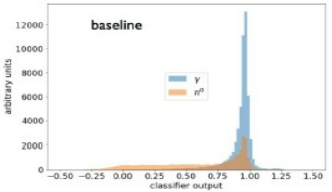
Cryogenics, helping to fight back against pandemic.

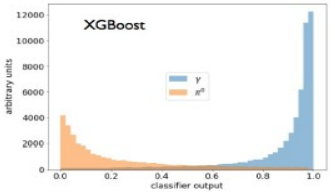
Machine Learning, Artificial Intelligence, Big Data at AANL

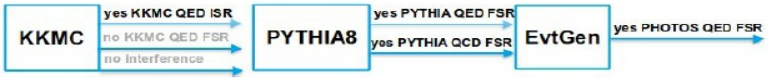


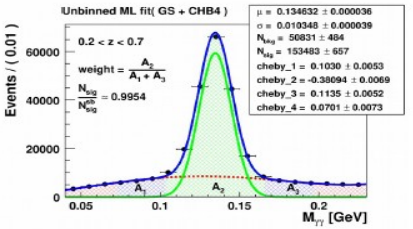


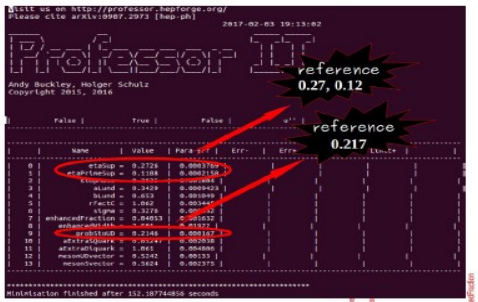
- large effect of ISR
- three options to generate the FSR
- maximum 10-20% effect of FSR on radiated photon spectrum at low momenta
  - source of systematic uncertainty
- tiny effect of ISR/FSR interference

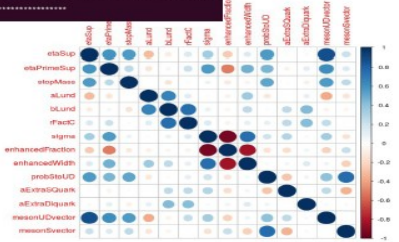






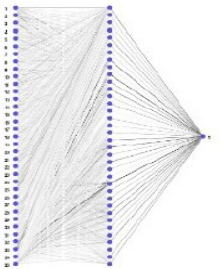


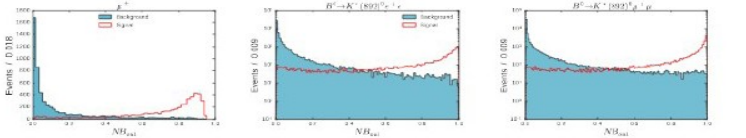




Multivariate approach

- Neural networks for all particles in the decay chain
  - Primary particles: $e^{\pm}$, $\mu^{\pm}$, $K^{\pm}$, $\pi^{\pm}$
  - K^* modes: $K^*(892)^0 \to K^+\pi^-$
  - Final B mesons
- Neural networks for signal selection (one for each B decay channel)
- Set of over 40 variables





IT/Computation (AI, Machine Learning, Quantum Computation), cooperation with IT companies on Big Data analysis techniques.

Develop close working relationships with international research centers and universities including visiting professorships of scientists from abroad to the AANL.

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National leader for publications in high impact factor journals.

Strong theory and experimental groups.

Collaborations with world class research centers and universities : high-impact researches.

One of national leaders in having access to the Big Data : strengthen the computational and IT capabilities, develop news ideas for data mining, quantum computing.

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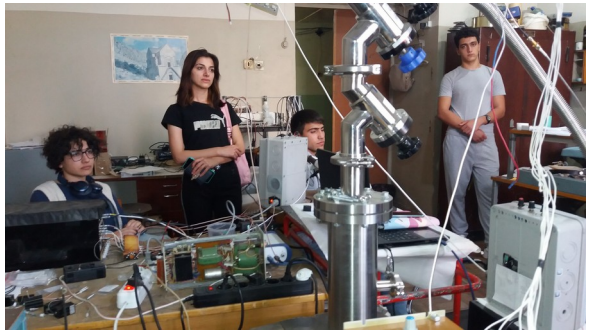

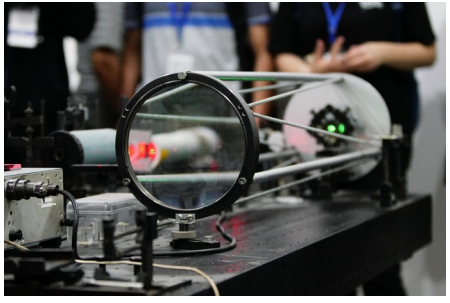

Enjoy your time in Yerevan!

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Conference on High Energy Physics September 11-14,Yerevan, Armenia