Travel Report of A.Chilingarian, DESY, Hamburg, Kiel, Karlsruhe, Germany, December 2- December12

On December 2 a meeting was held at DESY with chairman of DESY board Albrecht Wagner and deputy research director Manfred Fleischer.
After discussing possible strategy of YerPhI development Prof. Wagner agreed to be on advisory board of Yerevan Physics Institute to review scientific directions of the institute.
After examining HERA-B detector we agreed that CRD staff would participate in the detector dismounting (6 man-months), DESY would cover flight and leaving expenses and would send selected equipment and materials to CRD.

Figure 1Manfred Fleischer and Ashot Chilingarian near HRA-B experiment target, DESY, 2 December 2008

The NMDB midterm meeting was held in Kiel December 3-5, 2008 at the Institute for Experimental and Applied Physics of the Christian-Albrechts Universität zu Kiel.

On Wednesday, December 3rd, 2008, a scientific session on the Neutron Monitor (NM) data quality control, and particle data based forecasting and alert was organized; Aragats group presented 2 reports:

- Median Filtering Algorithms for the Multichannel Detectors
- On the possibility to forecast severe radiation storms by data from surface and space-born facilities

The attention of NMDB collaboration was attracted to the new created SEVAN particle detectors networks. In the same time when the meeting was held a group from YerPhI was installing SEVAN detectors in Bulgaria and Croatia. SEVAN detectors measuring simultaneously charged and neutral fluxes of cosmic rays have serious advantage upon neutron monitors and will be used both for the solar physics basic research and for the forecasting geomagnetic and radiation storms securing multibillion investment of civilization in space exploration.

Figure 2 Meeting of NMDB collaboration at Christian-Albrechts-University at Kiel, December 4, 2008

At the second day the working packages 1-3 were reviewed. During discussion of the new Data Acquisition (DAQ) registration electronics were recommended for the groups running neutron monitors, several important issues were declared: NKUA group plan to recommend PC based DAQ electronics based on the PCI Advantech 1780 and 1710 cards. The 20 μs dead time is accepted as standard by most of participants; if multiplicities are counted 1250 μs is used. The alternative embedded data acquisition electronics designed and fabricated by the CRD experts will also be in the list of the recommended DAQ systems.

The NMDB database acquires its shape and all the groups are sending data to it. NMDB is created with MSQL 5.1 software and WEB pages of NMDB.eu are created under DRUPAL. NMDB educational site can share the same design, or be a separate page with its own design already prepared by Aragats group.
Armenian group (Aram Yegikyan) prepares sophisticated front-end software for time series visualization and comparisons. The front-end software for the NMDB will be made by Aragats and Paris observatory groups independently. Both groups should communicate and coordinate activities with Athens and Ouly groups.

Work with user tools is still in progress. Aragats group and IZMIRAN group work on the filtering algorithms to check possible mistakes in time series. Askar Ibragimov from Ouly group asks for simple filters for overall check of database. He also offers to provide simple tool for updating the tables after filtering.
Training students and educational sections of project are very important and its planned to prepare lectures for students (to be send to Paris before March 1).

Euro-commissions offer to make an international meeting where participants from other continents will be invited to create global particle detector network. A new space weather initiative – space weather network is starting to operate.

NMDB next meeting is planned at ICRC in Lodz at 5-12 July where also a room should be arranged for a half-day meeting with Maria Giller.
The NMDB school is planned for October-November, it may be in Armenia (we should present the brochure and budget of school), the final NMDB meeting will be on December 3-5 in Greece or Israel.
Lev Dorman informs that final INTAS meeting will be in Israel on February 8-12, 2009. He also informed about kick-off meeting of the new **COST Action ES0803 *"Developing space weather products and services in Europe.*** The possibilities of CRD participation in this action should be urgently explored and appropriate letters written.

In Karlsruhe during a meeting with CRD employees Suren Chilingarian and Aram Yegikyan their working program for maintaining ADAS and DVIN software was detalized. The software designed by these software engineers is the crucial element of the ASEC data acquisition and presentation systems, enabling data transfer from the remote particle detectors located at the slope of mountain Aragats and their presentation in the Internet.
Participation of the Aragats group in NMDB and project of the software planned for the world-wide SEVAN network, created by the CRD was also discussed. The software should be decentralized and democratic: each SEVAN node should have access to data from all SEVAN stations for data analysis and educational purposes.
Institute of Nuclear Physics of Karlsrue actively participates in the world biggest Cosmic Ray experiment – AUGER collaboration, located in Argentina. Recently AUGER started to produce very interesting results on nature and origin of the highest energy cosmic ray. AUGER results locate the highest cosmic rays origin in the galaxies hosted super-massive black holes and pointed on the weighting of the mass of CR nuclei with enlarging energy, i.e. highest energy cosmic rays are mostly iron nucleolus.
Its experimental motivation comes from analysis of the distribution of first interaction height.
The mean value of the distribution for showers exceeding few units of 10^{19} GeV is shifted to the values obtained from simulation of iron nuclei propagation in the atmosphere.
The variance of distribution also became smaller after $5x10^{18}$ eV; it is also a feature inherent to the iron-initiated showers.
During discussions with director of the Institute of electronics and data analysis of the Research center Karlsruhe, prof. Hartmut Gemmeke an agreement was reached to start a network of FM antennas for solar radio-burst monitoring at Nor Amberd. First 3 antennas will be erected (prof. Gemmeke will bring 2 antennas to Armenia in May, 2009) and measurements will be started in summer 2009. Hardware (filters ADCs) will be prepared by CRD engineers, software library will be send from Germany.

Prof. Gemmeke is famous in Germany for creating numerous highly successful commercial spin-offs in his institute. These small enterprises are manufactured services and products in different topics starting from tiny sensors till sophisticated medical equipment.
Prof. Gemmeke agreed to be an advisory board at the YerPhI for helping to establish innovation/commercialization program here.
Prof. Johannes Knapp from School of Physics & AstronomyUniversity of Leeds also agreed to participate in the YerPhI advisory board. Prof. Knapp is active member of world-biggest cosmic ray collaborations AUGER and VERITAS, author of the CORSIKA code widely used in CR community and editor of the ASTROPARTICLE physics journal.