Curriculum vitae

RNDr. Blahoslav Pastirčák, Csc.

Personal data

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Work position: Senior Scientist at the Institute of Experimental Physics
of Slovak Academy of Sciences, Watsonova 47, 043 53 Košice, Slovakia
Nationality: Slovak
Date of birth: 03.07.1956
Marital status: widower, 5 children
Dependents: daughter Zuzana (2001), son Samuel (2003), son Šimon (2008)
Spoken foreign languages: English (C1), Russian (C1), Czech (C1),
German, Polish, Croatian

Education
1992
I have defended my PhD thesis "The study of dp interactions at 3.3 GeV/c from 1m JINR HBC"
in the field of Nuclear and Subnuclear Physics

1975 - 1981
Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava
Faculty of Mathematics and Physics, Charles University, Prague
Field: Nuclear Physics

1971 - 1975
Gymnázium Konštantínova, Prešov

Work Experience
2016 – up to now
Institute of Experimental Physics Slovak Academy of Sciences, Košice /JINR Dubna
Besides the JEM-EUSO activities I have started to participate on BAIKAL-GVD experiment, especially during may 3 month's stays every year. My work for Baikal-GVD was focused on Monte Carlo simulations and analysis of muon tracks produced by the flow of astrophysical neutrinos in the Earth's atmosphere. The main goal of the MC simulations is to characterize the muon tracks produced by the flow of astrophysical neutrinos in the Earth atmosphere, and to distinguishing them from the background produced by other sources in the Baikal-GVD experiment. The vast majority of events in the detector occurs from atmospheric muon bundles. The physics simulations for the Baikal experiment are carried out in three main steps. Simulations of the flow of atmospheric muons at sea level, transport of muons to the level of the detector, simulations of the response of the apparatus to the Cherenkov radiation of muons, including the work of the electronic systems of the telescope. The simulation of the contributions coming from the atmospheric muons was done by means of full simulation chain based on the CORSIKA package. The muons from the cosmic-ray-induced showers reaching the sea-surface shall be then propagated through water and rock to the detector simulated with the MUM code. At present new object oriented software package PROPOSAL has been started to be used instead of MUM. Results using both models were compared.

Primarily massive data bank of muons generated by CORSIKA for different primary particles and at different energies for further use in the simulation chain. Later, I moved on to the next steps of the simulation chain, specifically closest to the transport of muons through the environment to the detector. The original MUM Fortran software package will be replaced by the modern object-oriented software PROPOSAL. The main task will be to implement it and connect it to the simulation chain and compare the results using it compared to using the MUM package. I led two students of TU Košice working on this topic.

2010 – 2016
Institute of Experimental Physics Slovak Academy of Sciences, Košice
I have developed an interest in the field of extreme energy cosmic rays physics. The energy of such particles exceeds the highest reachable ones in laboratory conditions (LHC) by many orders. I participated in the preparation of a unique international experiment JEM-EUSO devoted to the above-mentioned problematics by registering and measuring these particles and for the very first directly from space. I was active in general for the determination of the UV background, which is expected to be extremely high compared to the signal we are trying to measure. Here I could use my many years of experience in shower simulations in the environment. As a special part of this task, I also analyze the fake trigger events' backgrounds by simulating them and then developing or adapting pattern recognition methods. They are then used to perform the simulation results. The full task will be integrated into the common general ROOT-based software framework ESAF (Euso Simulation and Analysis Framework), which is developed and used by JEM-EUSO collaboration. Since 2014, JEM-EUSO precursor experiments EUSO-Balloon and TA-EUSO started to operate and I am participating in the analysis of the data obtained by them. In the year 2016, I have started to participate in the Baikal experiment on the simulation part of the upgrade to the GVD project.

1991 - 2010
Institute of Experimental Physics Slovak Academy of Sciences, Košice/ CERN   senior scientist
In this period I was intensively participating in preparing the LHC planned experiment ALICE. As a member of the ALICE collaboration, I took responsibility for the calculations of radiation levels in the ALICE detector. This was performed mainly by simulations with the FLUKA particle transport MC simulation code. I have spent several (four times as a corresponding associate, two times as a scientific associate) up to 1 year stays at CERN working in that field. I have modelled the full ALICE geometry set-up, including surrounding civil engineering infrastructure in several options and preparing a simulation environment with all relevant physics contributions in the code. Subsequently, I have performed a series of radiation and shielding studies. Due to this, I have developed the analysis programs firstly in Fortran, and later in C++. The latter was integrated into the general ALICE software framework AliRoot. The overall radiation environment for all ALICE sub-detectors and electronic equipment was completed, described and published in ALICE Technical Reports and baseline document concerning this field. Among the problems which were solved, the most important are the following: beam shield studies in the muon part of the detector; the analysis of the background from beam losses; radiation studies for planned collisions; beam gas and beam halo background contributions; the study of the NIEL effects in electronic parts; the study of Single Event Upset in sensitive devices, and induced activity calculations.

I also started to participate in developing the computing infrastructure of my home institute and including it in distributed computing on GRID.

1986 - 1991
Institute of Experimental Physics Slovak Academy of Sciences Košice/ CERN   scientist
During this period I took active participation in the CERN WA94 and WA97 heavy-ion experiments. The heavy ion problematics became my main scientific research. As a member of our institute team in the WA94 and WA97 experiments I was responsible for the maintenance of offline software in our

laboratory and I contributed to physical simulations and data analysis on the Linux platform. Later, we extended studies of strange and multi-strange particle production processes in heavy-ion collisions at the SPS in experiment NA57, where I took an active part in data taking, reconstruction and analysis.

1982 - 1986
Institute of Experimental Physics Slovak Academy of Sciences, Košice/ JINR Dubna fellow
My research activity was devoted to the study of interactions of light nuclei with protons at relativistic energies using data from the JINR 1-meter hydrogen bubble chamber irradiated with light nuclei beams. For this purpose, I have spent several (4) many-months stays in Dubna, Russia. I concentrated primarily on the processing of data taken in the polarized deuteron beam and the following analysis. I have developed several analysis Fortran programs under UNIX OS. The most interesting results were those concerning the determination of the D-state of the deuteron wave function and the dibaryon states.

Teaching activities

 (2013 - 2022) Graduate lectures: "Ultra High Energy Cosmic Rays", Prírodovedecká fakulta UPJŠ, Košice, Slovakia
(2020-2022) CORSIKA Summer School. TUKE Košice, Slovakia

Supervisor of several PhD Thesis and many Master and Bachellor Thesis

Software experience

Fortran, Pascal, C/C++, Java, Python, Tcl/Tk, Linux administration and familiar with a large amount of scientific, educational and developing tools in linux, script languages, PAW, ROOT, GEANT3, GEANT4, FLUKA, PYTHIA, DPMJET, CORSIKA, CONEX, GENIE, PROPOSAL, GSEAGEN, MUM, AutoCAD

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Totak number of publications ~300

Total number of citations > 9800

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