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Media Release

University of Bern at the frontline of interdisciplinary research

From the creation of new radioisotopes for cancer therapy to «radiographs» of glaciers: The Swiss National Science Foundation (SNSF) funds four interdisciplinary research projects at the University of Bern with more than three Million Swiss Francs.

Fundamental research can lead to important applications when interdisciplinary competences meet. These applications can either open brand new research fields or lead to interesting applied science results, often of large impact to the society. The University of Bern is at the forefront of this kind of research: During the last 12 months alone, four special interdisciplinary projects led by Bernese researchers have been selected for funding by the Swiss National Science Foundation (SNSF) for a total amount of more than three Million Swiss Francs.

All these projects see both the Laboratory for High Energy Physics (LHEP) and the Albert Einstein Center for Fundamental Physics (AEC) as initiators and promoters as well as partners of other scientific institutes at the University of Bern. «The techniques originally developed for experimental particle physics experiments have often proven to be successfully applied to many fields», Antonio Ereditato, director of AEC-LHEP, says. «This is also the case with these four challenging and ambitious researches.»

Determining the age of meteorites

The first project, led by PD Dr. Beda Hofmann from the Institute of Geological Sciences and the Natural History Museum Bern and Prof. Marc Schumann of AEC-LHEP, deals with the study of meteorites. The goal is a high-accuracy study of the radioactive elements in meteorites by applying a technique used to build detectors for the search of the Dark Matter in the Universe. This technique will help scientists to better determine the meteorites type and their terrestrial age. For this study, a dedicated setup shielded against cosmic rays will be set up in the Swiss underground laboratory in the *Vue des Alpes* tunnel in the Jura mountains. This facility is the first in the world specifically dedicated to such a study on meteorites.

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Images of living cells

The second project deals with medical immunology and is conducted by Prof. Jens Stein from the Theodor Kocher Institute and Dr. Akitaka Ariga of AEC-LHEP. Cellular dynamical images are valuable tools for this type of biological studies. They allow scientists to analyze living cells in order to gain a better understanding of their immune responses against viruses and other pathogens. However, a strong limitation of such experiments is given by the speed in analyzing large image-data samples. The techniques used in particle physics experiments – for example at the CERN-facility in Geneva – allow overcoming these limitations with a new approach of image analysis techniques which compute enormous amounts of data in a short period of time.

New isotopes against cancer

The third project, conducted by Prof. Andreas Türler from the Department of Chemistry and Biochemistry and PD Dr. Saverio Braccini of AEC-LHEP, is aimed at the production of new radioisotopes in medicine. Scandium-43 is a potentially very interesting new medical radioisotope for PET beyond the standard fluorine-18 – PET is a diagnostics technique often used in cancer medicine. In the case of scandium one can even think of combining at the same time diagnostics and therapy (theragnostics) for a more effective service to the patients: The isotope could both help finding and destroying tumor cells in the human body. The new compounds will be produced at the cyclotron particle accelerator at the Inselspital, while radiochemical and biological research will then follow also involving the radiochemistry group of the Paul Scherrer Institute (PSI).

Glacier «radiographs»

The scope of the fourth project is to perform digital tomography of Swiss glaciers, also in this case, with techniques originally developed to detect elementary particles which constantly hit Earth, such as muons. Using them, scientists will be able for the first time to realize «radiographs» of the glaciers and obtain relevant information on their hidden structures – exactly like one can do for the human body with conventional X-ray radiography, but on a much larger scale. The study will for example help researchers to better understand how glaciers shape Switzerlands spectacular mountain ranges or how they react to climate change. It will be conducted by Prof. Fritz Schlunegger from the Institute of Geological Sciences and Prof. Antonio Ereditato, head of AEC-LHEP.

More funding – more researchers

Each of the projects above has received funds in the upper six-digit range. Funding from SNSF allows the institutes involved to hire ten new positions for young researchers: five Doctoral students and five Post Doctoral fellows. According to Antonio Ereditato this is «a particularly fortunate opportunity since they will acquire new competences at the boundary between different disciplines and could in turn be productive for new research fields in the continuation of their scientific careers.»

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