Universität Basel

Research Project

High Performance Transmission Electron Microscope for Present and Future Nanomaterials

Third-party funded project

Project title High Performance Transmission Electron Microscope for Present and Future Nanomaterials
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The rise of nanoscience and nanotechnology would not have been happened without the impressive development of instruments that allow to resolve structure on the nanometer scale with atomic resolution. Examples are scanning-probe and electron microscopy techniques. In recent years, several major breakthroughs gave rise to an exceptional boost in the performance of today's electron microscopy (EM), both for solid-state and soft (e.g. biological) materials: 1) high-resolution through image corrections, 2) fast and highly efficient electron detectors, 3) efficient artifact-free sample fabrication (cryo-EM and FIBEM), and 4) 3D tomography and image reconstruction. This has given a leap to what can be imaged today, allowing for example to reconstruct the atomic structure of single proteins and image complex interfaces in solid-state materials with atomic scale.

The University of Basel (UBAS) is nationally and internationally recognized as a leader in nanoscience and nanotechnology. It was the leading house of the National Center in Competence and Research (NCCR) on Nanoscience, which later became the Swiss Nanoscience Institute (SNI), the institution that submits the current proposal. UBAS is also co-leading the NCCR Molecular Systems Engineering and the NCCR QSIT on Quantum Science (both together with ETHZ). Nanoscience is a focus area in the research portfolio of UBAS and instrumental for the recent development of quantum science.

The present proposal to the SNF R'Equip scheme has been put together by key researchers at UBAS who work on current topics in nanoscience and nanotechnology in various disciplines from quantum science, material science, polymer chemistry to molecular biology, and, who make use of EM available within the SNI. The principle investigators, who submit this proposal together, do research that relies on the availability of state-of-the-art nanoimaging tools, such as a transmission electron microscope (TEM). The proposal outlines a convincing case for the purchase of special, unique TEM that combines state-of-the-art (and fast) atomic resolution imaging with material analysis using EDX and scanning TEM (STEM). This combination is unique and crucial for the University of Basel to stay at the forefront of science.

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Published results

4528835, Zelmer, Christina; Zweifel, Ludovit P.; Kapinos, Larisa E.; Craciun, Ioana; Güven, Zekiye P.; Palivan, Cornelia G.; Lim, Roderick Y. H., Organelle-specific targeting of polymersomes into the cell nucleus, 0027-8424 ; 1091-6490, Proceedings of the National Academy of Sciences of the United States of America, Publication: JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

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