AIRDEG- Advanced Ionizing Radiation Detectors by CMOS Compatible Graphene-Semiconductor Hybrid Schottky Junctions

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ABSTRACT

The AIRDEG project aims at exploring a novel class of radiation detectors based on the graphene semiconductor hybrid Schottky junction for accurate and precise detection of all kinds of ionizing semiconductors is sensitive to impinging radiation and can be utilized for radiation detection and spectroscopy in several applications, ranging from environmental and nuclear plants' radiation control, to dosimetry, radiotherapy or medical imaging, or particle detection in nuclear and sub-nuclear research.

A novel CMOS compatible radiation detection platform, with sensors and readout electronics integrated on the same chip, is the goal of the joint efforts of materials researchers, electrical engineers and condensed-matter and particle physicists. The final goal is the fabrication and demonstration of a general-purpose detector with high sensitivity and excellent energy resolution for real-time or integral radiation detection.

From a fundamental viewpoint, the project will boost the technology of 2D material heterojunctions and will investigate the effect of different types of radiation, such as x- or ɣ-rays, electrons, protons or alpha, on graphene and on graphene/semiconductor heterojunctions. While effects of radiation on graphene have received some attention, the interaction of ionizing radiation on graphene/semiconductor heterojunctions is completely unexplored to date.