PRESS RELEASE

AIXTRON
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AIXTRON: "NeuroSys" is a future cluster of the BMBF initiative "Clusters4Future"

Federal Ministry of Education and Research has named winners of the ideas competition / AIXTRON is a partner in the cluster led by RWTH Aachen University for research into learning-capable and energy-efficient neuromorphic AI chips

Herzogenrath/Germany, February 16, 2021 – The German Federal Ministry of Education and Research (BMBF) has published the winners of the "Clusters4Future" ideas competition. The funded clusters include the future clusters "Hydrogen" and "NeuroSys – Neuromorphic Hardware for Autonomous Artificial Intelligence Systems" from RWTH Aachen University and partners from the region.

AIXTRON SE (FWB: AIXA, ISIN DE000A0WMPJ6) is a partner of the future cluster "NeuroSys". As one of the leading suppliers of deposition equipment to the semiconductor industry, AIXTRON develops, builds and optimizes the necessary MOCVD tool for the new application. The work on the "NeuroSys" future cluster is expected to run for several years.

The future cluster "NeuroSys" researches adaptive and energy-efficient neuromorphic AI chips with the aim of allowing intelligent and resource-saving on-site data processing and thus creating an essential prerequisite for artificial intelligence (AI) applications. However, the use of AI poses challenges such as high CO_2 emissions, which further exacerbate climate issues. They arise when training large neural networks based on modern graphics processing units (GPUs) using deep learning methods. GPU-based neural networks are therefore ecologically unsustainable.

Neuromorphic systems for resource-efficient on-site data processing

Resource-efficient neuromorphic hardware that makes neural networks more efficient and provides for data security as a design component is therefore becoming the key to the widespread use of AI. This is especially true for application areas in autonomous vehicles, medical technology, and sensor networks for intelligent production or urban regions.

Neuromorphic systems are modeled on the two basic building blocks of the human brain, neurons and synapses. By integrating new materials with specific properties, they can ideally perform on-site processing of data in a way that conserves resources. This is summarized under the keyword "memristive" – from the English "memory" for memory and "resistor" for electrical resistance.

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Scientists at RWTH Aachen University and Research Center Jülich have already been able to demonstrate the functionality of neuromorphic devices made of memristive materials. However, there are no pilot lines or production capacities worldwide for the manufacture or integration of neuromorphic chips on an industrial scale.

Chips based on novel 2D materials

Also, the system of hardware, design, algorithms and application-driven software must work together to take advantage of the great benefits of neuromorphic hardware. What is required, therefore, is a paradigm shift with the opportunity to take a leading position in this new technology. "NeuroSys" aims to work out the crucial prerequisites here.

AIXTRON is at the beginning of the value chain in this project. Very thin layers of novel 2D materials, only a few atomic layers thick, are required as the material base for the neuromorphic chips. The production of these materials on the largest possible wafers is AIXTRON's core competence.

"Creating GPU-based neural networks that are environmentally sustainable is a major challenge. We are pleased to be able to make our contribution in the area of development and provision of the material base. As part of this and other projects, we will develop the world's most powerful technology platform for the industrial production of these materials and operate it in our laboratory in Herzogenrath," says Professor Dr. Michael Heuken, Vice President Corporate Research & Development at AIXTRON SE and Professor at RWTH Aachen University.

Important element also for structural change in the "Rheinischen Revier"

"The Future Cluster is a great opportunity for the Aachen-Jülich region, especially in connection with the structural change in the "Rheinischen Revier". We are stepping up to transfer excellent science to companies and startups in the region. Our vision is to set up a production line in the Aachen region. There, the co-integration of neuromorphic functions using new materials into conventional silicon technology will then take place," says Professor Max Lemme from the Chair of Electronic Components at the RWTH Aachen University and Managing Director of AMO GmbH. He is coordinating the research work.

In addition to RWTH Aachen University, the Research Center Jülich, AMO GmbH, IHK Aachen, the companies AixACCT Systems GmbH, AIXTRON SE, AppTek GmbH, ELMOS Semiconductor SE, RWTH Innovation GmbH and STAR Healthcare Management are involved in "NeuroSys". In addition, the start-ups AiXscale Photonics UG, Black Semiconductor GmbH, Clinomic GmbH and Gremse-IT GmbH are involved.

"Clusters4Future" is part of the German government's High-Tech Strategy 2025. The open-topic competition focuses on regional innovation networks that combine the strengths of the

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players, tap into emerging fields of innovation and develop solutions for the challenges of the future.

More information on the initiative „Clusters4Future" here

The "NeuroSys" project will be funded by the German Federal Ministry of Education and Research (BMBF).

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About AIXTRON
AIXTRON SE is a leading provider of deposition equipment to the semiconductor industry. The Company was founded in 1983 and is headquartered in Herzogenrath (near Aachen), Germany, with subsidiaries and sales offices in Asia, United States and in Europe. AIXTRON´s technology solutions are used by a diverse range of customers worldwide to build advanced components for electronic and optoelectronic applications based on compound or organic semiconductor materials. Such components are used in a broad range of innovative applications, technologies and industries. These include Laser and LED applications, display technologies, data transmission, SiC and GaN power management and conversion, communication, signaling and lighting as well as a range of other leading-edge applications.

For further information on AIXTRON (FSE: AIXA, ISIN DE000A0WMPJ6) please visit our website at: www.aixtron.com.

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