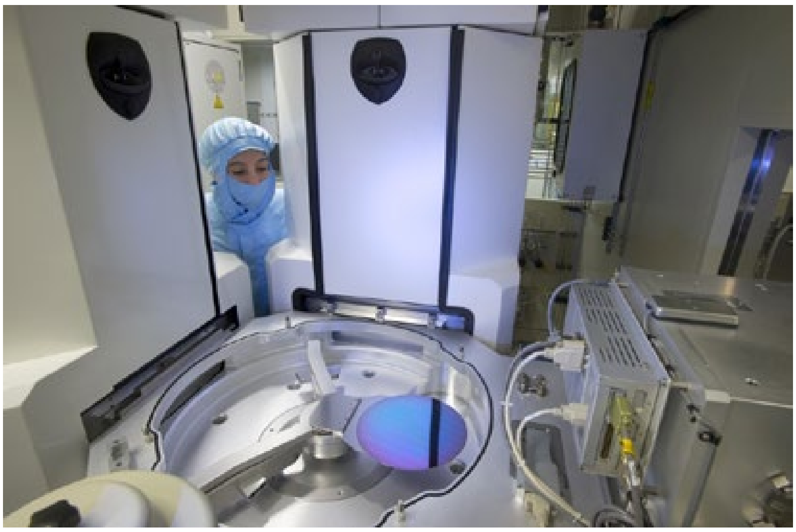
Fraunhofer EMFT

PRESS BRIEFING – 19 FEBRUARY 2020

On the way to brain-like computing: Kick-off for the EU project NeurONN

It is an exciting new research area that is becoming increasingly important in the context of the AI (artificial intelligence) megatrend: so-called neuromorphic computing uses technologies that imitate the human brain and nervous system. It is thus predestined to solve complex and comprehensive associative learning problems. At the same time, it offers the opportunity to significantly reduce the energy consumption of current silicon-based circuits.

In the EU project NeurONN, launched in early 2020, a research team from Fraunhofer EMFT is working with six European partners on a new neuromorphic approach based on energy-efficient elements and architectures. In the proposed neurologically inspired computer architecture, information is encrypted in the phase of coupled oscillating elements that are interconnected to form a neural network. Just like the brain, the two key components in neuromorphic computing are called *neuron* and *synapse* - they replicate the distributed computing and memory units. The neurons used in the project are novel elements based on vanadium dioxide, which can be 250 times more efficient than state-of-the-art digital oscillators based on CMOS.



Thermal assisted chemical vapor deposition on 8inch wafer

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Fraunhofer EMFT researches and develops sensor systems and actuators for people and the environment at its locations in Munich, Oberpfaffenhofen and Regensburg. The competences of the approx. 130 employees include manufacturing-oriented microtechnologies, innovative sensor solutions, microdosing and secure electronics.

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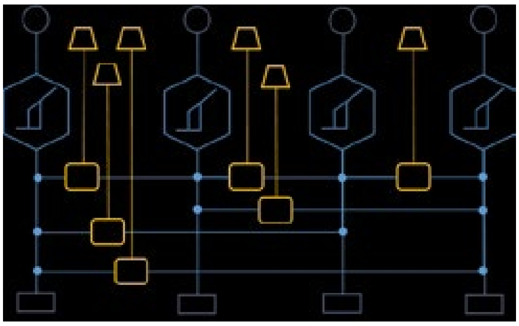
The work package of the Fraunhofer EMFT focuses particularly on the synapses: Within the framework of NeurONN, the scientists are developing 2D memristors on a nanoscale based on innovative 2D nanomaterials. The tiny devices are expected to be 330 times more efficient in terms of operating speed, lifetime and energy consumption than currently used technologies.

The project with a duration of 36 months (1 January 2020 - 31 December 2022) brings together leading European research and academic institutions: IBM Research Zurich, the Fraunhofer EMFT, CSIC/University of Seville, Silvaco, UK and AI Mergence, FR. It is coordinated by the French CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS. Additionally, NeurONN has initiated an industrial advisory board including members from Intel Corporation and Prophesee.

The NeurONN kick-off meeting took place in Montpellier (France) on February 4 and 5, 2020 at the premises of LIRMM, CNRS. The project is funded under the EU research program Horizon 2020 under grant number 871501.



Interconnected neurons
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The NeurONN research team at the kick-off meeting
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