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Short news

Energy-efficient technologies for neuromorphic computers

In the EU project "NeurONN", in which Fraunhofer EMFT is also involved, components and architectures for neuromorphic computing are being developed.

In the course of the AI megatrend, neuromorphic computing is also gaining in importance. Neuromorphic computers imitate the human brain and nervous system. The two key components – the "neurons" and "synapses" – replicate the distributed computing and memory units. Neuromorphic computers can thus solve complex associative learning problems and are also much more energy efficient than current silicon-based circuits.

In the "NeurONN" project, Fraunhofer EMFT and its partners are researching energy-efficient elements and architectures for neuromorphic computing. The approach involves encrypting information in the phase of coupled oscillating elements that are interconnected to form a neural network. The neurons used are novel elements based on vanadium dioxide, which can be 250 times more efficient than state-of-the-art digital oscillators based on CMOS.

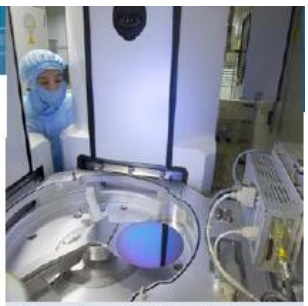
Fraunhofer EMFT is responsible for the development of the synapses, which consist in designing memristive systems based on novel two-dimensional materials. These are expected to be 330 times more efficient than currently used technologies in terms of switching speed, lifetime and power consumption. For the first time in Germany, EMFT will make available processing technology of two-dimensional materials monolayers on 8" diameter wafer.

The project runs from January 2020 to December 2022 and is funded under the EU's Horizon 2020 research program.

NeurONN

Besides Fraunhofer EMFT, the following partners are involved in the NeurONN project:

- Centre National De La Recherche Scientifique CNRS, France (project coordination)
- IBM Research, Zurich
- CSIC/University of Seville, Spain
- Silvaco, United Kingdom
- AI Mergence, France



Thermally assisted chemical vapor deposition on an 8" wafer.
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