# Advancements in semiconductor technology and energy efficiency drive industry growth



Lawrence Livermore National Laboratory (LLNL) is strategically enhancing research and development efforts for next-generation Extreme Ultraviolet (EUV) and plasma-based particle sources. The primary aim of this initiative is to dramatically increase the power of EUV laser sources by an order of magnitude while also making them more energy-efficient. To achieve this, LLNL plans to replace the current carbon dioxide (CO2)-based laser systems with a high-intensity solid-state laser, utilising a thulium-doped yttrium lithium fluoride medium.

The U.S. Department of Energy is anticipated to allocate $179 million towards the establishment of three new Microelectronics Science Research Centers. These centres will concentrate on a broad range of areas including research that intersects sensing technologies, edge processing, artificial intelligence (AI) and high-performance computing (HPC); integration of electronics in extreme environments; and advancements in plasma-based nanofabrication, EUV photon sources, two-dimensional material systems, as well as extreme-scale memory enhancements.

In a notable industry partnership, Synaptics and Google have announced a collaboration focused on Edge AI for the Internet of Things (IoT). Their intention is to seamlessly integrate Google’s MLIR-compliant machine learning (ML) core with Synaptics Astra hardware, leveraging open-source software tools.

Furthering advancements in lighting technology, researchers at the Hong Kong University of Science and Technology have developed a maskless microLED-driven deep ultraviolet (DUV) light source. This innovation is poised to significantly diminish the heat output typically produced by existing mercury-powered systems.

Addressing personnel movements within the semiconductor workforce, it has been reported that roughly 50% of employees at Taiwan Semiconductor Manufacturing Company’s (TSMC) facility in Arizona have made the relocation from Taiwan, indicating a trend of skill transfer and operational expansion.

Reports have surfaced detailing the substantial energy consumption of AI data centres, which are claimed to be generating detrimental electrical harmonics. According to findings from Whisker Labs and DC Byte, these harmonics disrupt the usual flow of electricity to residential areas, leading to overheating in household electronics and potentially creating new vulnerabilities that could result in electrical fires.

In further semiconductor industry developments, Micron Technology has committed an investment of up to $2.17 billion to expand its DRAM manufacturing facilities in Manassas, Virginia. Meanwhile, the UMC has received a temporary occupation permit for the expansion of its Fab 12i in Singapore, which is aimed at ramping production of 22nm and 28nm chips destined for applications in 5G, IoT, and automotive sectors.

Plans have also been approved for the Yongin Semiconductor National Industrial Complex in South Korea, which will comprise six fabrication facilities and three power plants alongside over 60 partnering small to medium enterprises. The project, expected to generate approximately 1.6 million jobs, is scheduled to commence construction in December 2026, ahead of its anticipated timeline.

In the Netherlands, a new ChipNL Competence Centre has been established, focusing on propelling the local semiconductor industry forward with support from the European Commission and the Rijksdienst voor Ondernemend Nederland, investing €12 million (approximately $12.6 million).

On the market front, GlobalFoundries and IBM have resolved litigation concerning breach of contract and trade secrets, thus ending their legal disagreements. Additionally, NAND Flash prices are projected to drop by more than 10% this quarter due to rising inventories coupled with dwindling demand, as per predictions by TrendForce.

In the realm of acquisitions, POET Technologies has acquired Super Photonics Xiamen, aimed at enhancing its capabilities in the production of 800G transceivers. Other significant acquisitions include Littelfuse's purchase of Elmos Semiconductor’s 200mm power semiconductor fabrication facility in Dortmund, Germany, and NVIDIA's recent acquisition of Run:ai, a firm that provides AI infrastructure orchestration software for a reported $700 million.

The automotive sector is witnessing considerable transformation, as signified by Tesla's recent report of its first annual sales decline in nearly a decade, contrasted by a more than 41% annual increase in vehicle sales for China’s BYD. Additionally, a toolchain for virtual homologation has been jointly launched by Ansys, Kontrol, TÜV SÜD, and Microsoft, enabling high-fidelity simulation to be utilised during the automotive certification process conforming to regulatory safety standards.

Events dedicated to the chip industry are upcoming, with several key gatherings scheduled throughout early 2025, including CES in Las Vegas from January 7-10 and the Chiplet Summit taking place in Santa Clara from January 21-23.

Source: [Noah Wire Services](https://www.noahwire.com)