IHP – Leibniz Institute for High Performance Microelectronics

Leibniz Institute for high performance microelectronics

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General Information

The IHP is one of the world's leading research institutions in the field of Silicon/Germanium electronics. In this field, it has extensive, closely coordinated expertise in semiconductor technology, materials research, high-frequency circuit design and system solutions. Its electronic and photonic-electronic technologies and circuits are among the most powerful in the world. In the speed of silicon-based transistors, IHP holds the world record with 720 GHz maximum oscillation frequency. The institute has a pilot line that manufactures circuits using its high-performance SiGe BiCMOS technologies. Through its research and manufacturing services, IHP contributes significantly to the innovative strength of Germany and Europe, especially in the field of ultrahigh-frequency electronics. The institute's research results are applied in socially important areas such as semiconductor manufacturing, wireless and power broadband communications, health, space, Industry 4.0 or Agriculture 4.0 and mobility.

IHP performs an important bridging function between universities and industry. The national and international "Joint Labs" with universities and universities of applied sciences are a particular manifestation of this successful cooperation.

Through its fields of activity: Resilient Systems, Sensing Systems, Radio Frequency & Broadband Communication Systems, Advanced Semiconductor Technologies and Device and Material Innovations, IHP is of key strategic and research policy importance to achieve technological independence and sovereignty for Europe. The institute develops technologies for science and industry, through the application of which they can achieve unique selling propositions and survive in global competition. The institute also makes an active and important contribution to the training of young scientists and engineers.

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Key facts

- Founded in 1983
- 350+ employees from 30+ countries
- In 2020:
  - 100+ running projects
  - Institutional funding: 33.5 million euros; Third-party funding: 17.2 million euros
- 5 research departments: Materials Research, Technology, Circuit Design, System Architectures, Wireless Systems

CENTRAL RELATED INFRASTRUCTURE & RESOURCES

- The heart of the IHP is the state-of-the-art pilot line in a 1.500 m^2 clean room, which is operated 24 hours/7 days a week. In addition, further 300 m^2 of cleanroom space is available to enable wafer interconnects and heterointegration of chiplets. The toolset enables 0.13 µm technology on 200 mm wafers. Cycle times are typically two days per lithography mask. Processing times from tape-in to shipping of diced chips are approximately 12 weeks, depending on the technology used.
- Digital- and Mixed-Signal SoC Test Service
- Material analysis and Metrology: visualization of surface and cross-section morphology of IC's, contamination analysis of Si Wafer (quantification and mapping), depth profile analysis of dopants (quantification and profile shape), thickness and stoichiometry measurements of thin films, strain and crystallinity analysis of epitaxial layer, surface analysis of organic contaminants, failure analysis of IC's, circuit modification