# Press Release

## Bundling unique European expertise for spaceborne devices

**Ferdinand-Braun-Institut, SweGaN AB, and University of Bristol are partnering in the European Space Agency funded Kassiopeia project. The teams join forces to develop high-performance Ka-band GaN MMICs (monolithic microwave integrated circuits). Applications for these devices include beam steering antennas for satellite communications and radar applications.**

Berlin, Linköping, Bristol, March 22, 2021

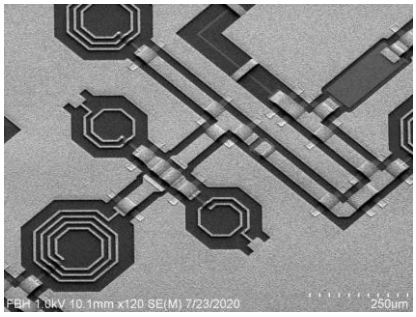
In March, the Kassiopeia project was launched to provide a value-added chain using internationally leading technology only available in Europe. The consortium project, led by Ferdinand-Braun-Institut (FBH) in Berlin, aims to demonstrate a fully independent European supply chain, from silicon carbide (SiC) substrates, gallium nitride (GaN) epitaxy, GaN device processing up to power amplifiers. For this purpose, Ka-band MMICs using novel epitaxy, processing, and circuit concepts towards highly efficient GaN and aluminium nitride (AlN) devices will be developed and demonstrated. The Ka-band frequency band is used, for example, in satellite communications.

FBH contributes its industry-compatible Ka-band MMIC technology on 100 mm GaN-on-SiC wafers. “Unique selling point of our GaN MMIC technology is its highly reproducible and reliable iridium sputter-gate technology”, emphasizes Dr. Joachim Würfl, head of FBH’s Power Electronics Department. “This technique reduces dynamic losses (gate lagging) to values up to two times less than competing institutional and industrial technologies.” The technology is also known to significantly improve device reliability. Together with new approaches in terms of process technology and circuit concepts both targeting for parasitic loss reduction highly efficient Ka-band MMICs will be developed. The groundbreaking technology will thus provide advantages in performance and reliability, which are particularly important for spaceborne devices.

SweGaN participates with its unique buffer-free solution for GaN-on-SiC epiwafers, QuanFINE®, bringing its expertise in epitaxial layer design and optimization to the project. SweGaN will also supply in-house developed semi-insulating SiC substrates for evaluation. These activities are financially supported by the Swedish National Space Agency (Rymdstyrelsen). SweGaN is recognized for providing GaN epitaxial wafers for sub-6 GHz and mm-wave transistors with a significantly low thermal boundary resistance and limited trapping effects – based on its proprietary buffer-free approach. The epiwafer specialist supplies epitaxial material to leading manufacturers of components and devices for satellite communications, telecom, and defense applications, plus power electronics for electric vehicles, solar inverters and more. "We are excited to participate in this ESA-aligned project together with FBH and University of Bristol, shares Jr-Tai Chen, CTO, SweGaN. Conventional GaN-on-SiC materials for Ka band applications still lack maturity, leaving significant room for innovation and improvement. SweGaN will introduce its revolutionary epitaxial manufacturing process to address the challenge.”

University of Bristol’s research within this program focuses on direct thermal measurements on active GaN transistors by using micro-Raman thermography and advanced device characterizations and modeling. This will provide a continuous feed-back to all device and epitaxial developments planned in Kassiopeia.

The Kassiopeia project is funded under the ESA ARTES Advanced Technology Programme: “European Ka-band high power solid-state technology for active antennas”.



SEM image of gallium nitride MMICs

The press picture is available here for download. All images are copyrighted.

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**About Ferdinand-Braun-Institut**
Ferdinand-Braun-Institut, Leibniz-Institut fuer Hoechstfrequenztechnik (FBH) researches electronic and optical components, modules and systems based on compound semiconductors. These devices are key enablers that address the needs of today's society in fields like communications, energy, health, and mobility. Specifically, FBH develops light sources from the visible to the ultra-violet spectral range: high-power diode lasers with excellent beam quality, UV light sources and hybrid laser systems. Applications range from medical technology, high-precision metrology, and sensors to optical communications in space and integrated quantum technology. In the field of microwaves, FBH develops high-efficiency multi-functional power amplifiers, and millimeter wave frontends targeting energy-efficient mobile communications as well as car safety systems. The FBH has a strong international reputation and ensures rapid transfer of technology by working closely with partners in industry and research. The institute has a staff of 340 employees and a budget of 40.4 million euros. It is a member of the Leibniz Association and part of »Research Fab Microelectronics Germany«. www.fbh-berlin.de/en

**About SweGaN**
SweGaN provides a unique solution for GaN-on-SiC epiwafers based on its ground-breaking epitaxial growth technology for manufacturers of RF components and devices for satellite, communications, and defense organizations and for power device makers. The high performance of SweGaN QuanFINE® material enables our customers to quickly adapt to the evolving challenges of next-generation high power and high frequency devices, and to create future-oriented solutions. For more information, visit us as www.swegan.se and LinkedIn.

**About Bristol University**
Ranked in the world's top 60 in the QS World University Rankings 2021, Bristol is one of the most popular and successful universities in the UK. At the cutting edge of global research, we have made innovations in areas ranging from cot death prevention to nanotechnology. The University is a chartered corporation and an exempt charity, whose legal status derives from a royal charter granted in 1909 and was the first higher education institution in the UK to admit men and women on an equal basis. At University of Briston, sustainability is part of everything we do: our research, our curricula, our buildings and the student experience. www.bristol.co.uk/university