

CORNET Call for Proposals: International Collective Research
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Organisation:	Fraunhofer Institute for Silicon Technology ISIT: Advanced Power Transistors Group
Website address:	http://www.isit.fraunhofer.de/en/power-electronic/advanced-power-transistors
Organisation typology:	<input type="checkbox"/> SME Association <input type="checkbox"/> University <input checked="" type="checkbox"/> Research Centre <input type="checkbox"/> Other (please specify)
Sector:	<input checked="" type="checkbox"/> Materials <input checked="" type="checkbox"/> Process Engineering, Energy Technology and Environment <input type="checkbox"/> Business Management and Organisation <input type="checkbox"/> Construction and Production <input type="checkbox"/> Chemistry, Textile, Food, Health and Medical <input checked="" type="checkbox"/> Measurement and Information
Field of specialisation:	Si-technology: IGBTs, PowerMOSFET, power diodes, passive components. GaN-technology: Quasi-vertical GaN diodes, HEMTs, vertical GaN transistors.
Expertise offered:	<p>Who are we and what do we do?</p> <p>Under the motto “<i>From Planar to Vertical: Custom Solutions for Advanced Si- and GaN-based Power Electronics</i>” our group of the Fraunhofer ISIT supports the continuous miniaturization of power electronics applications while increasing power density on system and device level. As a competent partner we offer the development of devices such as application specific Si-based PowerMOS transistors, IGBTs and diodes with reverse bias capabilities up to 1200V as well as advanced GaN-based power transistors and diodes with excellent electrical properties and switching speeds down to the ns range.</p> <p>Virtually discover our modern MEMS R&D cleanroom, that also includes our GaN manufacturing equipment: www.isit.fraunhofer.de/en/technology/360--degree-tour.html.</p> <p>Excerpt of our BEOL processes: https://www.isit.fraunhofer.de/en/technology/micro-manufacturing-processes/processes-on-wafer-level.html</p> <p>R&D focus</p> <p>Our R&D focus is application-specific device design and the development of new device architectures. Another important research topic is the development of new fabrication processes for advanced power devices at wafer level. For gallium nitride devices, ISIT is also developing front and backside contacting methods for bulk GaN as well as GaN-on-Si wafers.</p>

	<p>For system integration of passive devices, we offer the development of chip capacitors, precision resistors and inductors as well as corresponding chip-level circuits. At ISIT, the complete development chain from simulation and design, via the development of single processes to initial pilot production on 8" state-of-the-art manufacturing equipment with numerous characterization tools.</p> <p>Our offer in summary:</p> <ul style="list-style-type: none"> • Device design and layout • 2D/3D process and device simulation (Silvaco TCAD) • Process development and optimization • Pilot production (Si-based in automotive qualified front end, GaN-based in MEMS R&D cleanroom) • Electrical characterization • Failure analysis • Wafer-Level Packaging • Sinterable back and front metallization <p>Some of our use cases:</p> <ul style="list-style-type: none"> • Automotive power inverters for EV drives: The most compact electric drive in the world www.isit.fraunhofer.de/en/power-electronic/advanced-power-transistors/AutomotivePowerInverts • Passive components for high-frequency switched-mode power supplies: Microcoils – Integrated inductors with soft magnetic core based on Powder MEMS technology www.isit.fraunhofer.de/en/power-electronic/advanced-power-transistors/Microcoils • Silicon Membrane Technology: Smallest structures for detection & analysis of micro/nanoparticles – a byproduct of our trench technology development www.isit.fraunhofer.de/en/power-electronic/advanced-power-transistors/silicon-membrane-technology
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