



## Press release

### **SEMIKRON Foundation and ECPE honour the team from Silicon Austria Labs with the Innovation Award 2023 while this year's Young Engineer Award goes to Bo Yao**

**Erding, Germany, March 28<sup>th</sup> 2023**

This year, the jury decided that the SEMIKRON Innovation Award 2023 goes to Christian Mentin and his team members Thomas Langbauer, Ismail Recepti, Alexander Connaughton, Milan Pajnic, Franz Vollmaier, Werner Konrad, Philipp Matzick, Lukas Adelbrecht from **Silicon Austria Labs (SAL), Austria** for their **"Tiny Power Box - Next Generation of EV Charging Technologies"**.

In the frame of the "Tiny Power Box" cooperative research project the team from SAL has developed a 7kW bi-directional on-board charger (OBC) prototype more than 5-times smaller and 4-times lighter than state-of-the-art automotive solutions. This leap forward in power density was accompanied with an equally significant jump in energy efficiency thanks to the novel electro-thermal co-simulation and optimization method developed in the project. Typical OBCs today have a peak efficiency of 92% to 96% whereas the Tiny Power Box achieves 98% peak efficiency despite its very compact design. The developed OBC offers bi-directional operation and an integrated low-voltage DC/DC stage from the main battery voltage to 12V.

Besides the top benchmark values of the developed OBC regarding efficiency and power density, the holistic design-by-simulation workflow for power density optimization is highly appreciated by the jury members.

A significant impact of the innovation on future e-mobility can be expected from the very high performance in efficiency and power density in combination with the bi-directional functionality e.g. in vehicle-to-grid (V2G) and vehicle-to-home (V2H) scenarios.

The SEMIKRON Young Engineer Award 2023 goes to Bo Yao from the **Aalborg University in Denmark** for his work on **"A Robust kV and kA Testing Method for DC/AC Capacitors"**.

The work in the area of passive components is addressing a cutting-edge capacitor testing method, which is suitable for application-oriented testing of high-power capacitor banks e.g. in wind power, railway traction or electric vehicles. The innovative test method is able to emulate robust electrical stresses to DC/AC capacitors with minimum hardware cost and minimum energy consumption. Specifically, during the lifetime testing, the proposed test method can continuously apply kV and kA ripple stresses and keep the lowest power consumption regardless of the capacitor degradation, which cannot be achieved by conventional ways.

The circuit topology, control structure, and corresponding testing capability are well presented. Compared with existing test methods the proposed innovation clearly shows the superior benchmark of required power, ripple voltage and current range. The feasibility of the novel capacitor testing method has been successfully demonstrated and verified in full-power experiments on both DC and AC capacitors.



The presented method will enable application-oriented capacitor testing especially for MW converter systems e.g. in wind power and railway traction. It will not only offer significant energy savings during the capacitor test but also contribute to the safe and reliable converter operation in renewable energy and sustainable transport applications.

**Photo:** (front row f.l.t.r.) Peter Beckedahl (Semikron Danfoss), Christian Mentin (SAL), Bo Yao (Aalborg University), Bettina Martin (SEMIKRON Stiftung), Ismail Recepti (SAL), Prof. Leo Lorenz (ECPE), (back row f.l.t.r.) Thomas Langbauer, Philip Matzick, Franz Vollmaier, Alexander Connaughton (SAL)

**About the SEMIKRON Foundation:**

The SEMIKRON Foundation was founded on December 4, 2010, by owners of the SEMIKRON Group. Equal founders are the daughters of Peter Martin, the SEMIKRON owner and managing director of many years, who passed away in 2008. With the founding act, the founders intended to live up to their responsibility being the owners of a family-owned medium industry business and to contribute to their company's "Corporate Social Responsibility".

The purpose of the SEMIKRON Foundation is to bundle and extend the charitable activities operated by the owners of the SEMIKRON Group. In particular, the humanitarian projects initiated by Mr. Peter Martin, and supported by the Mali Martin Care e.V. charity are to be continued. These projects support children and people in need all over the world. Over the past 10 years, Mali Martin Care e.V. has donated more than one million Euro to humanitarian projects for children and young adults, mostly in Brazil (projects "Centro Social" and "Lar do Menor"). In addition, the foundation supports research projects and innovations in the field of power electronics. For more information, please visit: [www.semikron-stiftung.com](http://www.semikron-stiftung.com).

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