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Dr. **THEODOROS MOUSELINOS**
Keynote Speaker

PRESENTATION TITLE
**MULTILEVEL INVERTERS FOR PV SYSTEMS: INSIGHTS BEYOND THE CLASSIC TOPOLOGIES**

**ABSTRACT**
The photovoltaic (PV) systems offer multiple advantages for the production of clean energy, and this is the reason why they are placed at the top of investments in the last few years. Despite that the classic widely used topologies are reliable, in more and more applications multilevel inverter technology is deployed the last years, due to their advantages in lower voltage and power levels, such as increased efficiency and power density. Nevertheless, the adoption of such advanced topologies introduces some limitations, and for this reason constant efforts are made by the academia and industry to overcome the challenges. More specifically, in PV systems, where the boosting capability is also a must, academia and industry are making efforts to introduce hybrid topologies of multilevel inverters trying to combine the advantages of the multistepped voltage waveform with the voltage boosting capability. The classical PV system cascaded architecture of a Boost converter followed by a DC/AC converter is reliable, but further research is conducted towards hybrid topologies, featuring also partial processing characteristics to increase the overall power conversion efficiency. Analytical mathematical loss models, and optimization tools are necessary during the design phase, pushing the efficiency of these hybrid topologies close or even beyond the 99 % limit. Although efficiency is a major topic, compliance with the standards is also crucial, and thus the overall control structure along with the modulation technique should be considered. Concluding, the constant efforts in both industry and academia, and the newest Wide Band Gap technology, which pushes the Figure of Merits of the semiconductor devices higher, denote a wide adoption of multilevel converter topologies in wide spectrum of applications, voltage classes and power levels in the future.

**SHORT CV**
Theodoros Mouselinos received the Dipl. Degree in electrical and computer engineering in 2018 and the Ph.D. degree in power electronics in 2024 from the University of Patras, Rion- Patras, Greece. His research interests include the analysis, design, optimization and control of multilevel DC/AC converters and DC/DC converters for Renewable Energy Systems. From September 2022 until March 2024, he was holding the position of the R&D engineer at Raycap Inc., and he was responsible for the design and evaluation of high efficiency DC/DC converters for telecom infrastructure. From April 2024 until now, he holds the position of the System Application Engineer at Infineon Technologies Austria AG, focusing on AC/DC and high frequency DC/DC converters for datacenters.