

Ultra-wide band gap materials and devices for RF, power and extreme environment applications

Professor Chirag Gupta
University of Wisconsin
Presents

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ABSTRACT

Radio frequency (RF) and power electronics play a critical role in our daily lives. RF electronics enables high speed wireless communication (5G, 6G etc.), broadcasting, radars etc. Power electronics is now becoming a necessity for new applications such as electric vehicles, energy efficient data centers, motor drives etc. Additionally, these technologies are required in the defense sector as well to gain tactical advantage. For example, RF electronics is needed for radars, satellite communications etc. Power electronics enables lighter vehicles such as electric ships, electric aircraft etc., reduced power storage overhead etc. These applications are also coupled with extreme environments found in hypersonic jets, space exploration etc. Therefore, these applications require continuous improvement as well as new functionalities over incumbent technologies. In this regard, ultra-wide band gap materials are emerging as a new class of materials to serve these applications. In my talk, I will go over the advances made by our team (as well as in the field) to make these materials a reality in RF, power and extreme environment applications.

BIOGRAPHY



Chirag Gupta is an Assistant Professor at the Department of Electrical and Computer Engineering of the University of Wisconsin, Madison. Prior to joining UW Madison in Fall 2021, he worked as a device engineer in Maxim Integrated (now Analog Devices) on next-generation Silicon and GaN devices. He received a Ph.D. in Electrical and Computer Engineering (ECE) from the University of California at Santa Barbara in 2018. Before that, he obtained a B.Tech. in Electrical Engineering from the Indian Institute of Technology, Kanpur in 2013. His research is focused on wide and ultra-wide band gap materials and devices and is supported by NSF, ARPA-E, DoD (DARPA, ONR, AFOSR, AFRL) and industry. Gupta recently received the NSF CAREER award and the Early Career Innovator Award from UW Madison (awarded to 4 early career professors across UW Madison campus). Gupta currently holds 3 US patents and >13 pending patent applications. Gupta has authored >65 journal publications and has received multiple best paper awards as author/co-author of conference articles.