

Gallium Nitride Technology for RF Power Applications

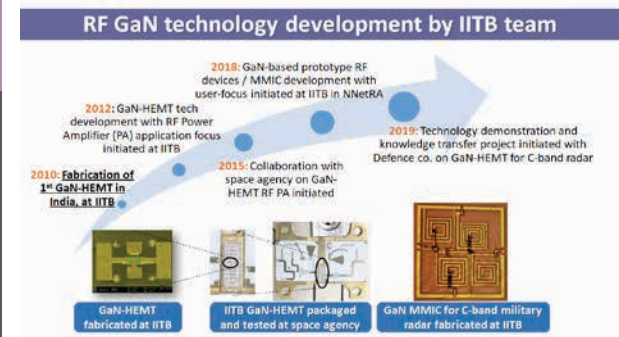
Problem Statement: A semiconductor device platform capable of high speed and high power handling is the key component-level building block for myriad RF power applications such as radar (defence, aerospace, and civilian—automotive), communications (defence, aerospace, and civilian—5G and beyond), signal jamming, and RF charging. These technologies are urgently required, especially by Defence and Aerospace agencies in India, as they are sensitive and controlled.

Uniqueness of the Solution: Gallium nitride (GaN) is a high speed and wide energy bandgap semiconductor material. A GaN-based High-Electron Mobility Transistor (HEMT) is a device drawing heavy attention and investment as the solution for RF Power applications. The team's benchmarking has revealed that the performance of the IIT Bombay GaN-HEMT technology is comparable to that of commercial vendors. The team offers licencing of GaN-HEMT fabrication

technology know-how, prototyping GaN-based devices and millimetre-wave monolithically integrated circuits (MMICs) for power amplifiers (PA), and design services for RF PA, with fabrication in the IIT Bombay fabrication lab or a commercial fab.

Current Status of Technology: The team has already been involved in technology demonstration and knowledge transfer projects with end-users in the Defence and Aerospace domain, namely a Defence Public Sector Enterprise and India's space agency.

Societal Impact: RF GaN-HEMT is a platform technology that can enhance the capability of space radars for remote sensing, space communications, automotive radar for safety, signal jamming for security purposes, including police/paramilitary operations, VVIP security, mega-event security and examination centres.



Patent(s): Filed

Relevant Industries: Defence, Security, Aerospace, Power.

Faculty: Prof. Dipankar Saha and Prof. Swaroop Ganguly, Electrical Engineering.