Medium Voltage Motor Drives

- SiC-based devices – 3.3 kV, 6.5 kV, and 10 kV.
- Neutral Point Clamped (NPC) and Modular Multilevel Converter (MMC) topologies have been studied using SiC devices.

Concerns – Large filters, Component counts, Complex structure.

Current Source Inverters (CSI) : Low Output Voltage Total Harmonic Distortion, Conducted Emissions, 4-Quadrant Operation.

SiC-based Current Source Inverter

- Power density > 40 % compared to baseline.
- Efficiency increases by ~ 3%.
- Operated at higher fundamental frequencies greater than 60 Hz.
- Fault detected within two fundamental cycles.

Future Work
- Operate the CSI at full voltage and power ratings.
- Implement an optimized MV-based coupled DC inductor design.

References