

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

Area: Power and Energy Systems (PES)

Host: Prof Akshay Kumar Rathore

TOPIC	:	High Voltage DC Power Supply with Full Range 24 Pulsed Input and Ripple Free Output
SPEAKER	:	Mr Manmath Kumar Badapanda Raja Ramanna Centre for Advanced Technology, Indore, Department of Atomic Energy, Government of India
DATE	:	Friday, 7 November 2025
TIME	:	4.00PM to 5.00PM
VENUE	:	E5-03-22 Seminar Room

ABSTRACT

Stringent performances are demanded from high voltage DC power supplies for biasing RF amplifiers and their performance requirements like low output ripple and low output stored energy are contradictory in nature, posing major challenges to the designer. A 36 kV, 24 A DC power supply is designed and developed, employing an uncontrolled 24-pulsed transformer rectifier at the front end to create an intermediate low voltage DC bus, feeding to 72 numbers of 500 V, 24 A controlled DC-DC power modules, outputs of which are connected series and combined synergistically, to achieve better input and output performances simultaneously at lower cost, which is in operation with Indus-2, Synchrotron Radiation Source located at RRCAT, Indore, India since 2016. The control of this power supply is on intermediate low voltage, even though both its input and output are on high voltages and its input section is completely independent of output section, so variations in input line voltages and control of output voltages neither affect its input performances like line harmonics and input power factor nor its output performances like output voltage ripple and stored energy. Speaker will briefly touch upon converter harmonics and input power factors, specialty of HVDC power supplies for biasing high power RF amplifiers and HVDC power supply schemes employed worldwide along with their common drawbacks. Then he will present the detail scheme, optimized control strategy, active redundancy incorporated and performance parameters achieved for 36kV, 24A DC power supply, which uniquely achieves full-range 36 kV ripple-free output with full-range 24-pulsed, 11kV input system simultaneously, in international scenario, irrespective of input voltage variations, output voltage requirements and number of faulty power modules, based on which US patent no.10027122B2 and Indian patent no.436206 are granted to him as their sole inventor, technology is transferred to multiple industries and adopted. Curial accepts of this work are published in several conferences and journals including in high impact factor IEEE Transactions on Power Electronics and also received Best Paper Award in IEEE Energy Conversion Congress & Expo (ECCE Asia-2025). Due to its superior techno-commercial-social impacts, this invention is likely to gain popularity for various research, scientific and industrial applications worldwide.

BIOGRAPHY

Mr Manmath Kumar Badapanda has received his Bachelor of Technology degree in Electrical Engineering from Veer Surendra Sai University of Technology, Burla, Odisha in 1988; Master in Technology degree with specialization in Electrical Engineering from Indian Institute of Technology, Banaras Hindu University, Varanasi, in 1990 and Post Graduate Diploma in Business Administration degree with double specializations in Marketing Management and International Trade from International Institute of Management Studies, Kolkata in 1999, all from India. He is working as Head, RF Power Supplies Section and Board Member at Raja Ramanna Centre for Advanced Technology (RRCAT), Indore, a premier Research and Development organization under Department of Atomic Energy, Government of India.

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