# Seminar

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# Institute for Plasma Research

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**Title:** Consideration of Physical Effects in Analysis of Harmonically Tuned Power Amplifier to Improve Its Theory and Design

**Speaker:** Dr. Syed Enamur Rahaman
Indian Institute of Technology, Dhanbad

**Date:** 07th July 2023 (Friday)

**Time:** 03:30 PM

**Venue:** Join the talk online:
https://meet.ipr.res.in/join/3883836258?be_auth=MDAxNzcy
*(Conference ID: 3883836258; Password: 001772)*

## Abstract

At first, a comparison between conventional and harmonically tuned power amplifiers (HTPA) will be provided. Then, the importance of harmonically tuned power amplifier (HTPA) in recent 5G and 6G applications and its working principle will be discussed. In the process of waveform shaping in HTPA, the output networks control higher order harmonics. This networks have several physical effects such as dielectric loss, conductor loss, and radiation losses, parasitic effect and reflection. However, these losses are not addressed in the existing PA design and analysis. Overall, harmonically tuned PAs available in existing literatures have many problems. These problems will be viewed in this talk. To consider losses and overcome problems, a new circuit efficiency in addition to the drain efficiency parameter is proposed and validated with a designing PA circuit. Next, it will be shown that how the general Electromagnetic Theory can solve the problems which related to reflected waves. Based on the EM theory, a general theory of harmonically tuned PA (HTPA) is proposed. After that, the usefulness of the proposed theory in the design of class F and continuous class F PA will be discussed. Then, its design, fabrication, and simulated and measured results will be discussed. Finally, the future work will be highlighted.