



**माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.), भारत**  
**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA**  
Deemed University  
(Declared under Distinct Category by Ministry of Education, Government of India)  
NAAC ACCREDITED WITH A++ GRADE



**Department of Electronics Engineering**  
**in association with IETE Students' Forum and IETE Bhopal Centre**  
**organized an**

**Expert Talk**  
**on**  
**Emerging Antenna Technology: Fractional Substrate Integrated Waveguide**  
**Solutions for Size Miniaturization**

**by**  
**Dr. Meha Agrawal**

**(12 January 2025)**

**An Expert Talk on “Emerging Antenna Technology: Fractional Substrate Integrated Waveguide Solutions for Size Miniaturization” organized by the IETE Bhopal Chapter in collaboration with the Department of Electronics Engineering, MITS Gwalior, on 12 January 2025.**

**The event began with a welcome address by Student Coordinator Soumya Dubey. Coordinators Soumya Dubey and Medhavi Agrawal then introduced Dr. Meha Agrawal to the audience and invited her to commence the session.**

Dr. Meha Agrawal is Postdoctoral researcher at Engineering and Optimization Center in Reykjavik University, Iceland. She is working on fractional SIW antennas for size miniaturization. Her research interests also include the controlling radiation pattern, cross polarization reduction in antennas, characteristic mode analysis, Eigen mode analysis, higher order modes, and circuit modelling of antennas.

She has published her work in many reputed international journals such as Nature Scientific Reports, IOP Journal of Physics, IEEE Antenna and Wireless Propagation Letters, Taylor and Franics, etc. along with patents and book chapters.

The session concluded with a **vote of thanks** delivered by **Dr. Himanshu Singh**.

This activity was coordinated by **Dr. Himanshu Singh** under the guidance of **Dr. Pramod Kumar Singhal** (Dean, Quality Assurance) and **Dr. Vandana Vikas Thakare** (Head of the Department, Electronics Engineering).

In total, more than 50 participants have attended this talk through Google Meet. The event successfully fostered curiosity and enthusiasm for RF and microwave engineering among the participants, making it a memorable and enriching experience.

# GLIMPSE OF THE EXPERT TALK by Dr. Ravi Yadav



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Department Of Electronics Engineering  
&  
IETE Bhopal Centre  
Presents



## EXPERT TALK

**TITLE:**  
Emerging Antenna Technology:  
Fractional Substrate Integrated  
Waveguide Solutions for Size  
Miniaturization

 **SUNDAY**  
12 January 2025

 **12:00 PM – 01.00 PM**

 **Online Mode**

 **E-CERTIFICATES  
FOR ALL**

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**Dr. Meha Agrawal**  
Postdoctoral Fellow,  
Engineering and Optimization  
Center, Reykjavik University,  
Iceland

Dr. Meha Agrawal is Postdoctoral researcher at Engineering and Optimization Center in Reykjavik University, Iceland. She is working on fractional SIW antennas for size miniaturization. Her research interests also include the controlling radiation pattern, cross polarization reduction in antennas, characteristic mode analysis, Eigen mode analysis, higher order modes, and circuit modelling of antennas.

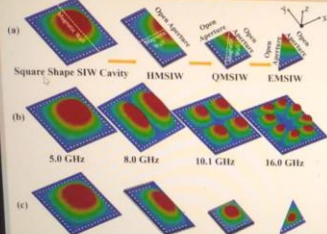
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Faculty Coordinator: Dr. Himanshu Singh : 9424072768  
Student Coordinators: Saumya Dubey : 9244309594  
Medhavi Agrawal : 6299317545

Dr. Vandana Vikas Thakare  
HoD,  
Electronics Engineering Department

Modes in Fractional Substrate Integrated Waveguides (SIW)

(a) Square Shape SIW Cavity: HMSIW, QMSIW, EMSIW




(b) Several modes in a square SIW cavity

(c) Dominant mode of HMSIW, QMSIW, and EMSIW

Parameters: SIW	HMSIW	QMSIW	EMSIW
Mode of Operation	$TE_{0,5}^{TM}$	$TE_{0,25}^{TM}$	$TE_{0,12,0,25}^{TM}$
Q-factor	<Full mode	<HMSIW	<QMSIW
Size	Half of full mode SIW	Half of HMSIW	Half of QMSIW
Size reduction	50% of Full mode SIW	75% of Full mode SIW	87.5% of Full mode SIW
Wavelengths supported within the substrate	Half-wavelength	Quarter-wavelength	Eighth-wavelength
Attenuation below cut-off frequency	>Full mode SIW	>HMSIW	>QMSIW
Bandwidth	Wider bandwidth	Between HMSIW and EMSIW	Wider than that of QMSIW

Electric field distribution in (a) square shape SIW cavity (designed with Rogers 5870 substrate, thickness of 1.57mm, and width of 28mm) and its various configurations, (b) several modes in a square SIW cavity (c) dominant mode of HMSIW, QMSIW, and EMSIW.

Comparative analysis between HMSIW, QMSIW, EMSIW based on structure and performance



12:30 PM | www.iteso.edu