

## IMPORTANCE AND SCOPE

The requirement for efficient and low-profile antennas has fuelled research work in the development of antenna structures with performances considerably enhanced over traditional antenna structures and methodologies. In this context, the development of the dielectric resonator antenna technology has taken significant strides in overcoming fundamental limitations in the design of broadband and efficient antenna structures.

It is well known that antenna structures like the microstrip patch suffer from reduced efficiency due to the stratified nature of the design, resulting in surface wave loss together with the presence of a conducting patch contributing to conductor loss in the antenna structure. The dielectric resonator antenna is ideally suited for low-loss applications due to the absence of conductors or surface-wave loss. Furthermore, the achievable bandwidth with the dielectric resonator topology of the order of 60% or more far exceeds that of broadband microstrip patch antenna configurations with typical bandwidths of 10 - 15% using parasitic patch loaded configurations. In addition, a noticeable feature of such bandwidth enhancement by the dielectric resonator antenna is that the wideband nature is accompanied by absolute stability of radiation characteristics across the large impedance bandwidth, making the radiation bandwidth identical to the impedance bandwidth. The above features of the dielectric resonator antenna make it an ideal choice for wideband low-profile applications with controlled radiation characteristics.

In spite of the potential of the dielectric resonator technology, analysis techniques for the dielectric resonator antenna have not received adequate attention particularly in the Indian context. This is particularly also significant as the analysis leads us to the in depth understanding of the modes of the antenna structure and their contribution to the dielectric resonator coupling problem. The workshop therefore also aims at introducing and investigating full-wave techniques for analysis of the antenna to offer a comprehensive coverage of the dielectric resonator antenna topic from the analytical, simulation and design aspects.

## KEY TOPICS TO BE ADDRESSED

- Planar and non-planar feeds to the dielectric resonator
- Wideband dielectric resonator antennas
- Circularly polarized dielectric resonator antennas
- Design and analysis of antennas in cylindrically and spherically layered medium
- Multiband dielectric resonator antennas
- Green's function analysis of the dielectric resonator antenna
- EMI / EMC
- Microwave components

## SPEAKERS

Faculty / domain experts from IIT, Kharagpur

## EXPERIMENTS

Coax-fed DRA

Aperture-coupled DRA

Conformal strip excitation of DRA

Multilayer DRA/ Wideband DRA

Dual-band DRA

Antennas on cylindrically and spherically layered medium

Cavity-backed DRA

Circularly polarized DRA

DRA array

**Central Library and lab visits.**

## Workshop Schedule

9 am to 6 pm with 1 hour lunch break each day.

## Workshop on “Dielectric Resonator Antennas” May 11-14, 2020

## General Information

Situated at a distance of 130 km from Kolkata, Kharagpur welcomes you with its green, calm and quiet campus, away from the din and bustle of city life. In winter, Kharagpur is particularly pleasant with bright flowers all around with a mild and comfortable climate. Historically, IIT Kharagpur started its journey in the “Hijli Detention camp”. Presently it houses a science and technological museum known as the Nehru Museum of Science and Technology. Also, the scenic township of Digha on the sea beach is only 120 km away from Kharagpur.

## Connectivity

Kharagpur is an important railway junction and is well connected to all parts of the country by rail service (SER). Numerous local & express trains are available from Howrah. The Institute is approximately 5 Kms from the Kharagpur railway station with the bus stand adjacent to the railway station. Rickshaws (Rs. 80), auto-rickshaws (Rs. 80) and taxis (Rs.150) are available from the railway station.

## WORKSHOP COORDINATOR

**Prof. Bratin Ghosh**

## Mailing address:

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## Accommodation & food

Limited shared accommodation is available in the guest houses VGH/TGH on personal payment basis. The charges are as follows: Daily charges: Rs. 150/- per bed (Non A/C three bedded and dormitory room in VGH); Rs. 400/- D/B A/C room single Occupancy in VGH; Rs. 600/- D/B A/c room double Occupancy in VGH; Rs. 250/- D/B Non A/C room single Occupancy in VGH; Rs. 300/- D/B Non A/c room double Occupancy in VGH; Rs. 1000/- D/B A/c room Single Occupancy in TGH; Rs. 1500/- D/B A/c room double Occupancy in TGH. On prior intimation we will try to arrange accommodation with the above charges. Workshop fees include lunch only with a cultural function and special dinner. Participants with families need to provide prior intimation.

## Eligibility for Participation

Teachers from Colleges / Institutions / Universities.  
Scientific Officers / Instructors / Technical Assistants  
/Research Scholars/Under Graduate and Post  
Graduate Students/ Participants from Industries.

## How to apply

Use the link: <https://erp.iitkgp.ac.in/CEP/courses.htm> to apply ONLINE.



Payment if applicable is to be done **ONLINE** after being short listed for the program.

Offline application accepted only for block booking (minimum 5 participants applying from same institute) at a discounted rate of Rs. 500.00 less per participant. The registration fees for such offline participants should be sent as a demand draft drawn in favour of '**CEP-STC, IIT Kharagpur**', payable at Kharagpur. **The draft should be sent to the mailing address of the workshop coordinator latest by May 4<sup>th</sup>, 2020.** The total number of seats in the workshop is limited to 50. In view of the limited seats, selection will be made on first come first serve basis.

**Last date of registration : 4<sup>th</sup> May, 2020.**

## Workshop fee :

### Domestic Participants

Workshop fees for Students **Rs. 7000.00**

Workshop fees for Industry **Rs. 14000.00**

Workshop fees for Teachers /  
Others **Rs. 10000.00**

**International Participants USD 300**

(GST 18 % extra per candidate for all participants)

Application fee (non-refundable) :

Rs. 500/- (domestic); USD 15 (international)

## Workshop On

**“Dielectric Resonator Antennas”**

**May 11 - 14, 2020**

*A Continuing Education Programme of  
Indian Institute of Technology  
Kharagpur*



## Organized by

**Department of Electronics and Electrical  
Communication Engineering  
Indian Institute of Technology  
Kharagpur – 721 302, India**

## About the Workshop Coordinator

**Prof. Bratin Ghosh** received his Bachelors in Electronics and Telecommunication Engineering in 1990 from Jadavpur University, Kolkata, Master of Technology in Electronics and Electrical Communication Engineering with specialization in Microwave Engineering in 1994 from the Indian Institute of Technology, Kharagpur and Ph.D. in Applied Electromagnetics in 2002 from the University of Manitoba, Canada. Thereafter, he completed his postdoctoral from the Royal Military College of Canada. He is currently Professor in the Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology, Kharagpur. He is a TPC member and an invited / keynote speaker and chaired sessions in many national and international conferences and seminars. He is also in the review and editorial boards of many international journals. He has been the recipient of many federal project grants in addition to research grants from the industry on the design of efficient antennas and guided systems. He has also organized many short term lectures and workshops in the field of applied electromagnetics that have been well attended by participants from both the academia and industry. He had been the recipient of the National Talent Search Scholarship, the University of Manitoba Graduate Fellowship and is Senior Member, IEEE. He is also actively involved in the design and analysis of cylindrical and spherical multilayer structures, efficient horn antenna feeds, dielectric resonator antennas, metamaterials, antenna miniaturization and numerical techniques. He has also edited a monograph on the full-wave analysis of guided wave structures and components.