

International Journal of Scientific Research and Reviews

Study of Optical Antenna and Their Application for Resonance Frequency

Anand Mohan

Govt. of India, P.G Deptt. of Physics C.M. Science College, Darbhanga, Bihar, India

Email: anandmohanjrf@gmail.com

ABSTRACTS

The requirement for GPS or WLAN Application consideration in design ,structure which cylindrical which is in shape which can enhance bandwidth of DRA Antenna operating band is used to enhance operation band depend upon feeding technique attract to use commonly. The cellular market demands electronic devices with high bandwidth with tiny size equipment. The dielectric resonator antenna has high permittivity from 6 to 100dielectricmaterial which mouted on ground plane, Nowadays we live on cell phone or android phone. Android phone is currently revolving around china phone market, because china cell phone Company has less making cost that main fact low cost mobile providing company. Nowadays we manage whole office or official secretarial in finger tip through advance level technology. The ultra high speed phone or advance generation phone has capabilities unrestricted call, unlimited data with high level networking, this article present attractive features of small size and low profile antenna which has design to develop for ultra wide –band (UWB) multiband DRAs which has various shape like Cylindrical ,Rectangular and Hemispherical which allows high level bandwidth .The basics properties of any antenna means ancient antenna to current (optical antenna)focusing on their design characteristics atterat attention global range.

***Corresponding author**

Dr. Anand Mohan

Formerly, J.R.F (DST), Govt.of India, P.G Deptt.of Physics

C.M. Science College, Darbhanga, Bihar, India

Email: anandmohanjrf@gmail.com

INTRODUCTION

Modern wireless communication requires high speed mobile wireless communication to develop high level technology which can use different purposes of portable communication devices. Antenna plays an important role in any technical or communicational devices. We improve communicational devices like cellular phone which is playing a very important role so; we need to improve its performance for communication system. Nowadays Antenna provide high level gain its bandwidth is also high^{1,2}. The many types of antenna uses for many purpose of communication, which is able to achieved smartly to improves its of communication system which is depend upon various parameters³. The Current trends of information communication technology works on concept of architecture, which is dependent part of complex, which has proposed in this research article. Nanoantenna are small in size in conventional antenna which works or operate at the optical frequencies⁴. In this research article we introduce optical antenna (optical- antenna) which works on nanoscale frequency DRA antenna has high permittivity with low reduction optical DRA allowing numerous application DRA Proportional permittivity in $\epsilon\gamma$ material⁵. The Antenna field structures do not need λ bandwidth in Advance generation communication system have very high sensitivity material for digital community with high efficiency. The Antenna has not only transmitting and receiving devices it is key part, Nanoantenna has high level configurable conductor⁶. The dielectric resonator Antenna has good networking to connect one device to another device⁷. The Specific feature of DRA or optical DRA moving around development of human life or convenient life⁸. The broadcasting Technology only has power to change our life with help of advanced technology or current technology. Nowadays we live on cell phone or android phone⁹. Android phone is currently revolving around china phone market, phone market because china cell phone Company has less making cost that main fact low cost mobile providing company¹⁰. Nowadays we manage whole office or official secretarial in finger tip through advance level technology. In this Research article we introduced new idea to develop our brain to Gain high level efficiency¹¹. Up – coming generation mobile phone or GPS, Android; cell phone has more power full usability for human being. Now cell phone works on ultra high speed network which has enough potential to change the meaning of android phone or cell phone usability¹². The ultra high speed phone or advance generation phone has capabilities unrestricted call, unlimited data with high level networking, this article present attractive features of small size and low profile antenna which has design to develop for ultra wide –band (UWB) multiband DRAs which has various shape like Cylindrical, Rectangular and Hemispherical which allow high level bandwidth. The basic properties of any antenna means ancient antenna to current (optical antenna) focusing on their design characteristics attract attention global range. Optical DRA offers Gold particle with high level engineered material¹³. The bit size of optical antenna context is very small. DRA Frequencies patterns and efficiency of antenna achieved higher of antenna increasing impedance value. The optical DRA antenna seems to be usable and scalable to propagate to provide high & advance level technology for nanoplasmonic devices¹⁴. The surface planer of optical DRA Antenna has mostly focused on characterization ultra-wideband, whereas lower permittivity with many operating frequencies with millimetres dimension geometrical properties antenna size are often limiting factors for free space resonator antenna has their maximum dimensions is D which relates to free space resonator wavelength (λ_0) by the bandwidth of DRAs operating at GHz or THZ Frequency¹⁵. Optical DRA Shapes can be used for design thought rectangular shape or cylindrical shape, which give resonant mechanism play very important role in telecommunication field which has high flexibility of rectangular in shape but some restriction in shape¹⁶. The design and parameters play main key advantage of optical DRA antenna fabrication because first we have to optimize its parameters then it will be merging two different wavelength model at nm, THz wavelength scale¹⁷. The intensity of antenna aperture wavelength

for incident radiation λ which relates to it design or demonstration, which direction scattering can enhanced in terms of optical DRA radiation field¹⁸.

NANOANTENNA FOR FARFIELD RESONANCE FREQUENCY

The optical nanoantenna can be measured radiation patterns for far field resonance .The bandwidth of optical transmission of MIMO DRA has free space optical transmission effects on optical channel differentiability is easily understood the general problem open for Maxwell equations is free space propagation ,which is open some solution for free type scattering process of linear optics. The mathematically represent the amplitude of phase function is simplify by Maxwell’s homogeneous space for wave equation is $\mathbf{K}=\mathbf{K}_0 \sqrt{\epsilon \mu}$

$$(\nabla \times \nabla + k^2) \mathbf{E} = 0 \dots \dots \dots \text{equation (1)}$$

In general electric field applied for vector current distribution and polarization of quantum optics, non homogeneous environment substrate is strongly modified radiation patterns distribution which is proportional to mirror of reflector of coefficients.

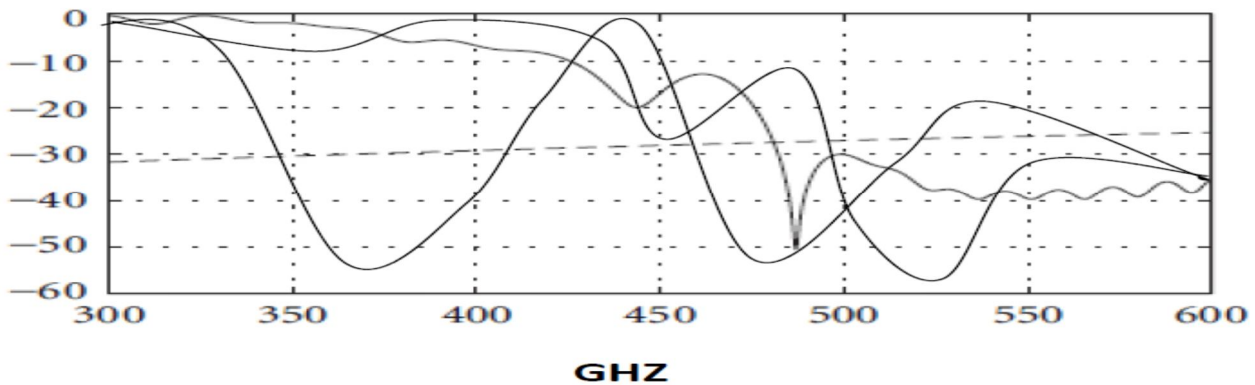


Fig.1. Return Loss of Optical Dra Antenna At Ghz

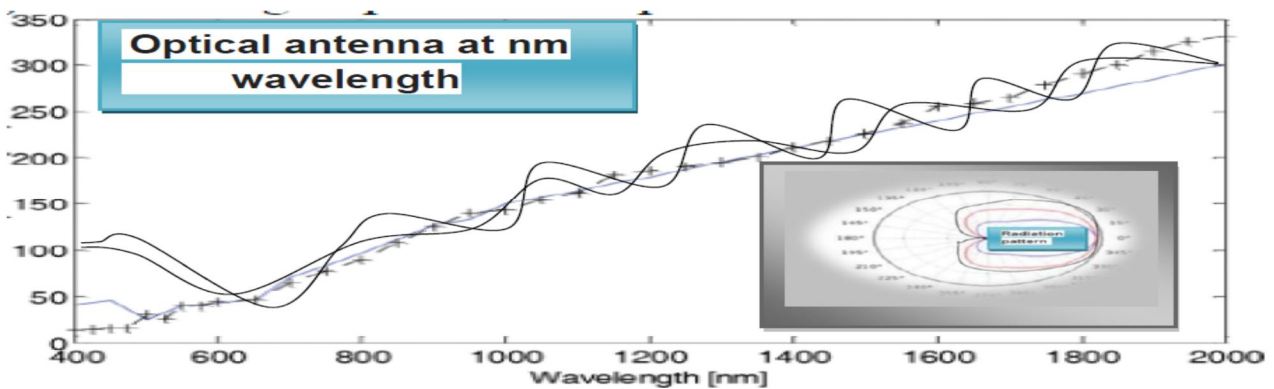


Fig.2. Antenna Radiation pattern optical DRA antenna

OPTICAL DRA AND ITS CONVERSION

The optical DRA antenna transforms electric current into electromagnetic radiation or vice versa. The resonance spectrum of optical nano antenna strongly influence on resonance properties which increase dimension of optical antenna which has great practical interest for high index

materials. Although optical DRA antenna frequency regime provides easy approaches to design structure which can decide radiation properties of optical dielectric antenna. The light-matter interaction has strong coupling between near-field radiation theory at nano-scale which transmits multiple data for optical fiber at digital domain. The optical Resonator Antenna (ORA) is also applicable for GPS devices or nano-satellites which have developed for the convenience of life or easy life for the Global Positioning System (GPS) has very accurate time. We are living in an ITR (Information Technology Revolution), where people are connected one place to another interfacing which between propagating radiation and localized field of optical antenna wave. The quantum optics are focusing on absorption and cross-section of quantum yields photo-voltaic or photo-chemical resolution of optical microscopy.

CONCLUSIONS

In this research paper we presented the novel approaches of the directional Nano antenna, which is excited from the MIM plasmonic. Optical antenna could be used to provide high level gain its bandwidth is also high. Many types of antenna used for many purposes of communication, which is able to be achieved smartly to improve its communication system which is dependent upon various parameters. The current trends of information communication technology works on the concept of architecture, which is a dependent part of a complex, which has been proposed in this research article. Nanoantennas are small in size in conventional antenna which works or operate at the optical frequencies. Optical DRA antenna has high permittivity with low reduction optical DRA allowing numerous applications. DRA Proportional permittivity in $\epsilon\gamma$ material. The Antenna field structures do not need λ bandwidth in advanced generation communication systems have very high sensitivity material for digital communication with high efficiency. The Antenna not only transmitting and receiving devices it is a key part. The dielectric resonator Antenna has good networking to connect one device to another device.

ACKNOWLEDGMENT

This Research Paper is an outcome of a fellowship sponsored by the Department of Science and Technology (DST), Govt. of India. I am grateful to the Department of Science and Technology, Govt. of India for financially supporting me through the Junior Research Fellowship during this work.

REFERENCES

1. Mohan, A., The advanced generation mobile broadband technology for wireless communication system and its applications. IJAR, 2015; 1(12): 383-385. www.allresearchjournal.com/archives/2015/vol1issue12/PartF/1-12-113.pdf

2. MOHAN, ANAND. "RADIATION CHARACTERISTIC OF METALLIC NANO- PARTICLE WITH APPLICATION TO NANO-ANTENNA." "An Experimental Study of Effect of Amalkirasayan and Amalkiswaras with Help of Electron Microscopy" 1-9 8, no. 5&6 2014; 45.
3. MOHAN, ANAND."SYNTHESIS OF BI-METALLIC NANOPARTICLES AND ANALYSIS OF THEIRPERFORMANCES." "An Experimental Study of Effect of Amalkirasayan and Amalkiswaras with Help of Electron Microscopy" 1-9 8, no. 5&6 2014; 59.
4. Mohan, A. Study of Plasmonic Nano Antennas and Their Optimization., International Journal of Emerging Research in Management &Technology ISSN: 2278-9359 2016; 5(5) Special Issue on International Conference on Advances in Engineering (ICAE) -2016 Conference Held at Hotel Magaji Orchid, Sheshadripuram, Bengaluru, India.
5. Mohan Anand "ROLE OF NANOANTENNA SYSTEM IN TRANSFORMING THERMAL ENERGY, Airo International Research Journal ISSN: 2320-3714; 7 June 2016
6. Mohan Anand "IOT: A BIG REVOLUTION FOR NANOSCIENCE" 7th virtual NanotechnologyPosterConference<http://www.nanopaprika.eu/group/nanoposter/page/p17-21>
7. Sachchida Nand Singh; Ashok Kumar: Anand Mohan: Study of nanoantennas for enhanced Optical emission, Proceedings of International Conference on Advances in Light Technologies and Spectroscopy of Materials (ICALTSM - 2016), January16-18, 2016; 256,
8. Akyildiz IF, Jornet JM, Han C. Terahertz band: Next frontier for wireless communications. Physics Communications. 2014; 12:16–32. DOI: 10.1016/j. phycom. 2014.01.006
9. Anand Mohan, Cylindrical dielectric resonator antennas (CDRA) & its applications for human life, ISCA, Souvenir of 4th International Virtual Congress IVC-2017, ISBN: 978-93- 84659-68-4, 2017
10. Nagatsuma T, Ducournau G, Renaud CC. Advances in terahertz communications accelerated by photonics. Nature Photonics. 2016;10(6):371–379
11. Anand Mohan, Ashok Kumar, Uses of Optical Nan antenna in ICT and its Ability, Souvenir of 3rd International Virtual Congress, 3rd International Virtual Congress IVC-2016, ISBN: ISBN: 978-93- 84648-78-7, 2016
12. Anand Mohan, Study of Plasmonic Nano-Materials for Surface enhanced Localized Surface Plasmon Resonance Spectroscopy (LSPR) &Their Applications for Optical Antennas, Indian Journal of Agriculture and Allied Sciences, ISSN 2395-1109 Year: 2015; 1(4)
13. Anand Mohan, "Cylindrical Dielectric Resonator Optical Antenna (CDROA) & its Applications for Convenient Technology", International Journal of Computer Sciences and Engineering, 2019; 7(1): 283-286,. <https://doi.org/10.26438/ijcse/v7i1.806809>

14. Anand Mohan, "Optical Antenna: A Key Enabling Aerial For Device To Device Communication", International Journal of Computer Sciences and Engineering, 2018; 6(8):306-309, 2018. <https://doi.org/10.26438/ijcse/v6i8.306309>
 15. Stutzman, W. L.; Thiele, G.A. Antenna Theory and Design; John Wiley & Sons: New York, 2012.
 16. S. Hranilovic and F. Kschischang, "Short-range wireless optical communication using pixelated transmitters and imaging receivers," in Proc. of the IEEE International Conference on Communications, Paris, France, Jun. 20–24, 2004; 891–895.
 17. T. Fath, M. Di Renzo, and H. Haas, "On the Performance of Space ShiftKeying for Optical Wireless Communications," in Proc. of the IEEE Global Communications Conference - Workshop on Optical Wireless Communications, Miami, Florida, USA, Dec. 10, 2010; 990–994.
 18. Anand Mohan , "Study of Optical – nano antennas and their Application". Ph. D Thesis (Physics).2018
-

ABOUT AUTHOR



Dr. Anand Mohan is working as a Junior Research Fellowship (**J.R.F**) P.G Dept. of physics C. M. Science College Darbhanga, Bihar, Graduate from Lalit Narayan Mithila University (LNMU) Physics, (Hons). He received the Post Graduate in MSc (Electronic) with Top Ranking (Gold medalist). Medal was given by Honble Speaker of LOK SABHA & CHANCELLOR of Central University of Bihar, He did his Ph. D degree in 2019 from L. N. Mithila University, Darbhanga, His research interest include microwave applications, Optical antenna applications, signal processing, Carbon nanotube, Nano antenna and ultra wideband Applications & wave propagation. He has published numerous research articles in National & International journals and conference proceedings, National seminar & symposium. Article was published in the 6th Bihar Science Conference, 2014 An International Conference on Science & Technology in 2014. He has been honored Young Scientist Award by BHU Varanasi in 2016 .He is also the Member in editorial Board of the journal "Asian Journal of Advanced Basic Science. He is also an INSPIRE Fellow from DST, Govt. of India as well as life member of the ISCA, IASC, LASSI, IAPT, IST. He is member of editorial board of green earth research network (GERN) an international journal of all research. He

Serve as a advisory board member in many national or international conferences. He is Fellow of International Science Community Association. He is member of editorial board of International Journal of Applied Research, which includes

The IAENG Society of Artificial Intelligence, Hong Kong.

- The IAENG Society of Computer Science, Hong Kong.
- The IAENG Society of Internet Computing and Web Services, Hong Kong.
- The IAENG Society of Imaging Engineering, Hong Kong.
- The IAENG Society of Information System Engineering, Hong Kong.
- The IAENG Society of Operations Research, Hong Kong.
- The IAENG Society of Scientific Computing, Hong Kong.
- The IAENG Society of Software Engineering, Hong Kong.
- The IAENG Society of Wireless Networks, Hong Kong