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Optical Antenna: A Key Enabling Arial For Device To Device Communication

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Abstract- The optical antenna transmits optical signals on nanometer scale. The nano-scale devices are expected to radiate in – THZ frequency range. The optical antenna has unique biological Application for communication networks to be analyzed. Its frequency response with high mode conductive antenna element for nano devices. The optical antenna has unique and key application for such types of area based configuration for optical communication devices. The optical antenna made-up nanoparticle like gold, particle because the calculation of three dimensions is possible in infrared band. In this research articles we have studied about antenna emission, distribution, characterization of terahertz (THZ) optical emission with high resonance of nanoantenna optical frequencies result. The wavelength optical antenna 400 nm nano-scale enable to study for far field radiation distribution.

Keywords: Optical antenna, terahertz (THZ), DRA antenna, Gold-particle, nanoscale transmit, Dielectric Antenna, spontaneous emission, nanoparticle

I. INTRODUCTION

The optical antenna has unique ability to transmit or receive radio-frequencies at nanoscale [1, 4]. The optical antenna opens new area for research due to design creation, manipulation, transmission, reflection interaction with high ability to generate short range radio-frequency [5, 6]. The optical communication devices play very important role in nano-range communication [7, 8]. The optical antenna has multiple wave length incoming radiation which associates with out-going radiation frequency domains. The optical nano-antenna made of Gold nano-particles [9,10]. The key requirement of optical antenna is that antenna material must be Au/Ag element because gold and silver properties have superior performance as well enhancement is very strong and spontaneous [11, 12]. Emission has minimal loss properties compared to other element properties.In this research articles we have studied about antenna emission, distribution, characterization of terahertz (THZ) optical emission with high resonance of nanoantenna optical frequencies result[13,14]. The wavelength optical Arial 400 nm nano-scale enables to study for far field radiation distribution.

1.2. Optical response of Gold nano-particle

The optical antenna has unique spectral ability to optimize antenna design in nanometer scale; efficiency of antenna design depends upon the optical response of Gold nano-particle. The RF antenna analogue frequency which has excellent directive properties for optical region operations to design nanostructure construction. The optical nanoantenna has potential to control on light emitted devices for sub wavelength properties to create and make it possible to nanoscale transmit as well as receive RF single to enhance the antenna material in THZ scale.

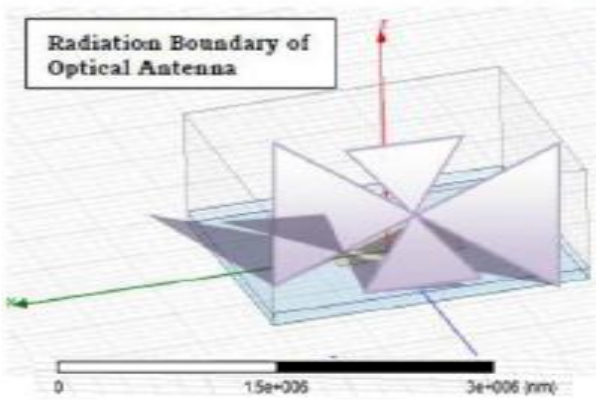

Fig.1 (a). Radiation Boundary of Optical DRA antenna design in nm

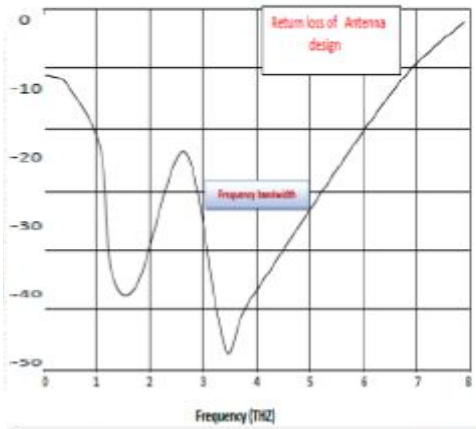

Fig.1 (b) Simulated return loss response of The CDROA – antenna THZ Frequency

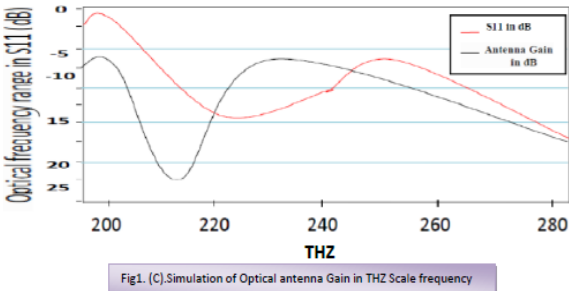

Fig1. (C).Simulation of Optical antenna Gain in THZ Scale frequency

II. Optical Dielectric Resonators Antenna Design

Nanoantenna has ability to transmit optical frequency with nanoscale wavelength. Antenna provides high gain permittivity of antenna material has great potential to achived Radiation in db-deviation is increased with small radiation variation pattern of Antenna wavelength. Simple we can say that transmitting and receiving equipment (system) is called Antenna. The optical antenna concept has great approach to propagate Antenna system. In this research paper we have proposed unique type dielectric resonator optical antenna which works on nanometer scale. Optical antenna has unique consideration to optimize energy as well as radiation efficiency may vary optimal. Generally traditional antenna uses dielectric material to make its structure to design by high level software may be possible to manipulate or, simulation based demonstration for dielectric Antenna. In this research article we have applied optical DRA antenna to control multi channel receiver with high band width for optical communication. This approach should work well with Dielectric Optical Antenna. Limitations which consider to enhance the spontaneous emission is favourable to obtain exact wavelength for minimizing the gap & set smaller range gap for unique manufacture technique with high permittivity and emission has enhanced and perfect condition performance at 400 nm scale boundary.

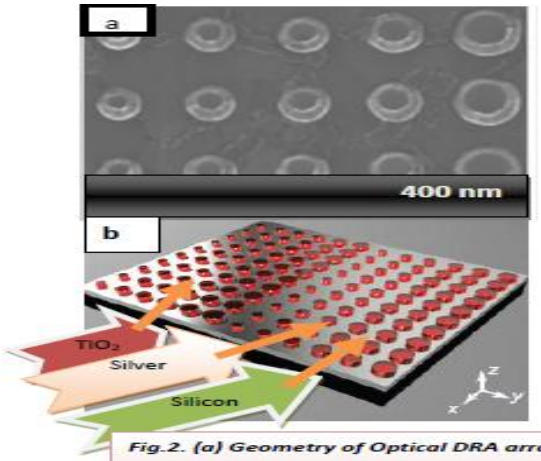

Fig.2. (a) Geometry of Optical DRA array

Fig.2. (b) Scanning electron micrograph of Optical Dielectric resonator Antenna

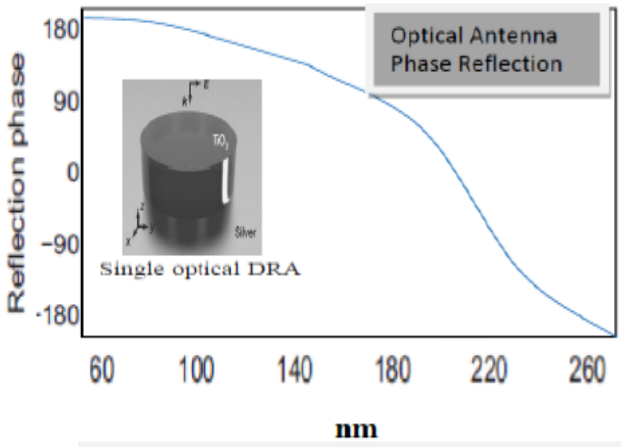

Fig.2(C).Phase reflection of Single optical DRA antenna

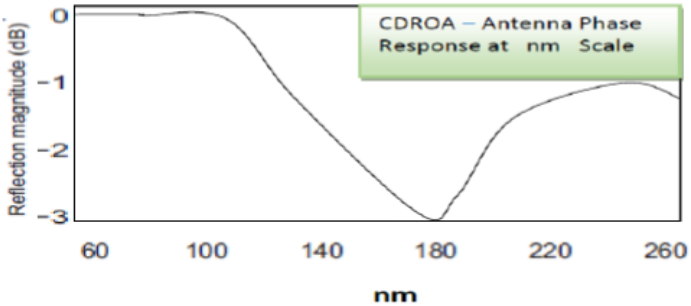

Fig.2 (d). Reflection Magnitude of Single optical DRA antenna Phase Response in nm scale

III. Optical Antenna

A new powerful tiny sophisticated Arial or technology which has great potential to enhance light – mater interaction at nm scale.

IV. Optical Properties of Antenna

The optical properties antenna materials quality plays very important factor in Antenna technology. The resonance of Antenna geometry can affect on scattering of light in particular electron which involve in scattering of Antenna wave propagations.

V. Material and Method which affect application

We have studies as well as use the Gold particle which has great efficiency for Antenna geometry. We have choosed the incident wavelength at nm range 400 nm several theoretical aspects realized that Antenna parameters will change its performance.
Optical Antenna has several attractive useful applications to control communication system which has dielectric constant to tune resonance frequency which can enable to control its configuration in terahertz component.

VI. CONCLUSIONS

In this paper we have studied as well as proposed new method to design optical Antenna which has enable to study this radiation distribution of electromagnetic range. This research work will very helpful to improve Antenna efficiency at nanoscale. In this Research paper is totally concentrated all about Antenna material, Application, Wavelength scale, fabrication methodology which has high band width for optical communication system to integrate Antenna design for maxima level transmitting efficiency. We demonstrate in our simulations base approach work well with Dielectric Antenna. We have presented very new tread communication Arial at nanoscales operation with high bandwidth application to nanomaterial Antenna design due to its high impedance at nm frequency range. Optical Antenna (Arial) promotes to utilise Antenna materials at terahertz and optical range. We have used the Gold particle. Which has high efficiency for Antenna geometry. We have choosed wavelength at 400 nm scale. The optical properties of Antenna material has important factor to design Antenna at nm scale. In this paper we have proposed unique type Dielectric optical Antenna which has special feature for communication networks to be analyzed. The frequency response depends upon optical response of Gold-particle. Optical Antenna has very unique ability to transmit optical frequencies at nanoscale wavelength.

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Authors Profile

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 Hon˝ble Speaker of LOK SABHA & CHANCELLOR of Central University of Bihar, His research interest include microwaveapplications, Nanoantennas applications, signal processing, Carbon nanotube, Nanoantenna 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.

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