

3.4.3 Number of Patents published/awarded during the last five years (10)



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Application Details

APPLICATION NUMBER	201831009592
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	15/03/2018
APPLICANT NAME	TEZPUR UNIVERSITY
TITLE OF INVENTION	DESIGNED 2D GRAPHITIC SHEET FOR VISCOUS OIL REMOVAL USING MAGNET
FIELD OF INVENTION	GENERAL ENGINEERING
E-MAIL (As Per Record)	info@ipindiaasa.com
ADDITIONAL-EMAIL (As Per Record)	anjanonline@vsnl.net
E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	05/02/2019
PUBLICATION DATE (U/S 11A)	20/09/2019

Application Status

APPLICATION STATUS	Application referred u/s 12 for examination.
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THE PATENT OFFICE

पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

क्रमांक : 011128625
SL No :



पेटेंट सं. / Patent No. : 351940
आवेदन सं. / Application No. : 1742/DEL/2013
फाइल करने की तारीख / Date of Filing : 11/07/2013
पेटेंटी / Patentee : 1.TEZPUR UNIVERSITY (CENTRAL UNIVERSITY)
2.DEPARTMENT OF BIOTECHNOLOGY, MINISTRY OF
SCIENCE & TECHNOLOGY

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित MULTIFUNCTIONAL NANOPARTICLES AND METHODS FOR SYNTHESIS THEREOF नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 11th day of July 2013 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled MULTIFUNCTIONAL NANOPARTICLES AND METHODS FOR SYNTHESIS THEREOF as disclosed in the above mentioned application for the term of 20 years from the 11th day of July 2013 in accordance with the provisions of the Patents Act, 1970.



अनुदान की तारीख : 23/11/2020
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, 11th day of July 2015 को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 11th day of July 2015 and on the same day in every year thereafter.



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PATENT CERTIFICATE
(Rule 74 Of The Patents Rules)

क्रमांक : 033115684
SL No :



पेटेंट सं. / Patent No. : 365565
आवेदन सं. / Application No. : 1296/KOL/2014
फाइल करने की तारीख / Date of Filing : 15/12/2014
पेटेंटी / Patentee : TEZPUR UNIVERSITY
आविष्कारक (जहाँ लागू हो) / Inventor(s) : 1.DEB, PRITAM 2.DEKA, KASHMIRI

प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित NANOCATALYST FOR BIO OIL PRODUCTION नामक आविष्कार के लिए, पेटेंट अधिनियम, १९७० के उपबंधों के अनुसार आज तारीख 15th day of December 2014 से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled NANOCATALYST FOR BIO OIL PRODUCTION as disclosed in the above mentioned application for the term of 20 years from the 15th day of December 2014 in accordance with the provisions of the Patents Act, 1970.



अनुदान की तारीख : 28/04/2021
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, 15th day of December 2016 को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 15th day of December 2016 and on the same day in every year thereafter.



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Application Details

APPLICATION NUMBER	1295/KOL/2014
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	15/12/2014
APPLICANT NAME	TEZPUR UNIVERSITY
TITLE OF INVENTION	MESOPOROUS SECONDARY NANOSTRUCTURES AS MULTIFUNCTIONAL HEAVY METAL SCAVENGER
FIELD OF INVENTION	CHEMICAL
E-MAIL (As Per Record)	
ADDITIONAL-EMAIL (As Per Record)	anjanonline@vsnl.net
E-MAIL (UPDATED Online)	anjanonline@bsnl.in,info@ipindiaasa.com
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	07/12/2018
PUBLICATION DATE (U/S 11A)	17/06/2016
REPLY TO FER DATE	16/03/2020

Application Status

APPLICATION STATUS	Application in Hearing
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Application Details

APPLICATION NUMBER	201731009379
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	17/03/2017
APPLICANT NAME	Tezpur University
TITLE OF INVENTION	MAGNETIC SECONDARY NANOSTRUCTURE AS CONTRAST AGENT FOR MAGNETIC RESONANCE IMAGING
FIELD OF INVENTION	CHEMICAL
E-MAIL (As Per Record)	anjanonline@vsnl.net
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E-MAIL (UPDATED Online)	anjanonline@bsnl.in
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	10/10/2020
PUBLICATION DATE (U/S 11A)	12/02/2021

Application Status

APPLICATION STATUS	FER Issued, Reply not Filed
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Application Details

APPLICATION NUMBER	201931014698
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	11/04/2019
APPLICANT NAME	TEZPUR UNIVERSITY
TITLE OF INVENTION	A TWO DIMENSIONAL HETEROSTRUCTURE BASED NANO-COMPOSITE FILM FOR PACKAGING
FIELD OF INVENTION	MECHANICAL ENGINEERING
E-MAIL (As Per Record)	anjanonline@vsnl.net
ADDITIONAL-EMAIL (As Per Record)	info@ipindiaasa.com
E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	--
PUBLICATION DATE (U/S 11A)	16/10/2020

Application Status

APPLICATION STATUS	Awaiting Request for Examination
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Book

Introduction to Cognitive Radio Networks and Applications

Edited By Geetam Tomar, Ashish Bagwari, Jyotshana Kanti

Edition	1st Edition
First Published	2016
eBook Published	16 October 2016
Pub. Location	New York
Imprint	Chapman and Hall/CRC
DOI	https://doi.org/10.1201/9781315367545
Pages	340
eBook ISBN	9781315367545
Subjects	Computer Science



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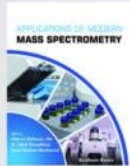
Chapter

Basics of Cognitive Radio Networks: An Appraisal

By Rajib Biswas

Book [Introduction to Cognitive Radio Networks and Applications](#)

Edition	1st Edition
First Published	2016
Imprint	Chapman and Hall/CRC
Pages	6
eBook ISBN	9781315367545



Applications of Modern Mass Spectrometry

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Recent Developments of Allied Techniques of Qualitative Analysis of Heavy Metal Ions in Aqueous Solutions with Special Reference to Modern Mass Spectrometry

Pp. 98-127 (30)

DOI: 10.2174/9789811433825120010008

Author(s): Bijoy Sankar Boruah, Rajib Biswas

Abstract

Heavy metal ions are basic elements of earth crust. These metal ions are non-biodegradable in nature and tend to accumulate in our ecosystem in due course of time. Some of the most toxic heavy metal ions include arsenic, mercury, cadmium, lead, nickel etc. The toxicity level depends on density for any biological system. Due to increasing applications of heavy metal ion compounds in industrial, agricultural and medical fields, water pollution induced by excess levels of heavy metal ion becomes a big crisis for us. As such, detection of heavy metal ions in water is an important issue for us. Mass spectroscopy methods are the most conventionally applied methods for the detection of heavy metal ions in water. Some of the mass spectroscopic methods are atomic absorption spectroscopy, inductively coupled plasma mass spectroscopy, graphite furnace atomic absorption spectroscopy etc. These methods have well detection capability of heavy metal ions in water with good selectivity and sensitivity. Along with mass spectroscopic methods, the use of optical fiber technology for heavy metal ions detection is remarkable. Optical fiber based sensors system for the detection of heavy metal ions basically works by changing the effective refractive index of its surroundings. For selective binding of heavy metal ions, sensitive layers are coated on optical fiber probe. Laser or light emitting diode is used as a light source in an optical fiber sensor for signal purpose. Accordingly, output response for various heavy metal ions is recorded on an optical spectrometer. From their output response, we can determine the concentration of metal ions present in water. It is noticed that optical fiber sensor can also have good sensitivity and selectivity towards the detection of heavy metal ions as mass spectroscopy methods.

Keywords:

Arsenic, Cadmium, Colorimetric, Detection, Electrochemical, Heavy metal ion, Lead, Mass spectrometry, Mercury, Optical fiber sensor, Sources of heavy metal ions.



Book

Advances in Photonic Crystals and Devices

Edited By Narendra Kumar, Bhuvneshwer Suthar

Edition	1st Edition
First Published	2019
eBook Published	25 September 2019
Pub. Location	Boca Raton
Imprint	CRC Press
DOI	https://doi.org/10.1201/9781351029421
Pages	376
eBook ISBN	9781351029421
Subjects	Engineering & Technology



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Citation

ABSTRACT

In recent decades, there has been a phenomenal growth in the field of photonic crystal research and has emerged as an interdisciplinary area. Photonic crystals are usually nanostructured electromagnetic media consisting of periodic variation of dielectric constant, which prohibit certain electromagnetic wave frequency ranges called photonic bandgaps to propagate through them. Photonic crystals elicited numerous interesting features by unprecedented control of light and their exploitation is a promising tool in nanophotonics and designing optical components. The book 'Advances in Photonic Crystals and Devices' is designed with 15 chapters with introductory as well as research and application based contents. It covers the following highlighted features:

- Basics of photonic crystals and photonic crystal fibers
- Different theoretical as well as experimental approaches
- Current research advances from around the globe
- Nonlinear optics and super-continuum generation in photonic crystal fibers
- Magnetized cold plasma photonic crystals
- Liquid crystal defect embedded with graphene layers
- Biophysics and biomedical applications as optical sensors
- Two-dimensional photonic crystal demultiplexer
- Optical logic gates using photonic crystals
- *A large number of references*

The goal of this book is to draw the background in understanding, fabrication and characterization of photonic crystals using a variety of materials and their applications in design of several optical devices. Though the book is useful as a reference for the researchers working in the area of photonics, optical computing and fabrication of nanophotonic devices, it is intended for the beginners like students pursuing their masters' degree in photonics.

TABLE OF CONTENTS

Chapter 1 | 15 pages

[An Introduction to Photonic Crystal Fiber: Modal and Structural Parameters](#)

By Dimpri Paul, Rajib Biswas

[Abstract](#) ▾

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Book

Internet of Things

Integration and Security Challenges

By S. Velliangiri, Sathish A. P. Kumar, P. Karthikeyan

Edition	1st Edition
First Published	2020
eBook Published	30 December 2020
Pub. Location	Boca Raton
Imprint	CRC Press
DOI	https://doi.org/10.1201/9781003032441
Pages	222
eBook ISBN	9781003032441
Subjects	Computer Science, Engineering & Technology



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Citation

ABSTRACT

IoT is empowered by various technologies used to detect, gather, store, act, process, transmit, oversee, and examine information. The combination of emergent technologies for information processing and distributed security, such as Cloud computing, Artificial intelligence, and Blockchain, brings new challenges in addressing distributed security methods that form the foundation of improved and eventually entirely new products and services. As systems interact with each other, it is essential to have an agreed interoperability standard, which is safe and valid.

This book aims at providing an introduction by illustrating state-of-the-art security challenges and threats in IoT and the latest developments in IoT with Cloud, AI, and Blockchain security challenges. Various application case studies from domains such as science, engineering, and healthcare are introduced, along with their architecture and how they leverage various technologies Cloud, AI, and Blockchain.

This book provides a comprehensive guide to researchers and students to design IoT integrated AI, Cloud, and Blockchain projects and to have an overview of the next generation challenges that may arise in the coming years.

TABLE OF CONTENTS

Chapter 1 | 12 pages

[A Brief Overview of IoT Architecture and Relevant Security](#)

By R. Biswas

[Abstract](#) ▾



Spectrum Sensing Techniques: An Overview

Rajib Biswas (Tezpur University, India)

Source Title: Sensing Techniques for Next Generation Cognitive Radio Networks

Copyright: © 2019 Pages: 8

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DOI: 10.4018/978-1-5225-5354-0.ch007

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Abstract

Cognitive radio has come a long way in the recent years with the advent of improved algorithms and instrumentation. However, for ease and efficient working of cognitive radio, there is a need to have effective detection of spectrum sensing. The objective of spectrum sensing techniques is to find spectrum holes which can be accessible by the users of cognitive radio. The deployment of suitable sensing techniques reduces undesirable congestion in traffic and enhancement of spectrum usage. All these require sensing techniques whose main goal is oriented towards efficient identification and subsequent deployment of spectrum. This chapter is aimed to give a brief overview of some spectrum sensing techniques. An attempt is made to give the characteristics of the highly deployable sensing schemes. Accordingly, the merits and demerits are comprehensively highlighted. Further, emphasis has been given to relevant future challenges.

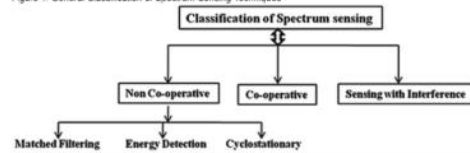
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Spectrum Sensing Methods

There are several ways of sensing spectrum. Chiefly, it is categorized into two-namely co-operative and non-co-operative. However, there arises another classification known as interference based sensing. It is depicted in Figure 1. Again, the co-operative sensing is split into three ways, viz., matched filtering, energy detection and cyclostationary detection. In the following section, the sensing techniques are elaborated.

Figure 1. General Classification of Spectrum Sensing Techniques





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Debika Kangsha Banik is working as an Assistant Professor in the Department of Physics, Barnagar College, Sorthog since October, 2018. She completed her M. Sc. and M. Phil from Tezpur University and Dibrugarh University respectively and also pursuing her Ph. D. from the Department of Physics, Dibrugarh University. Her area of research is "Cosmology". She has been actively participating in both teaching and research activities and participated in several national and international workshops, conferences, seminars, webinars, FDPs, STCs etc. She has published number of research papers/articles in various journals of national and international repute as well as in edited books.



Dr. Nayan Mani Nath is presently working as an Assistant Professor in the Department of Physics, Barnagar College, Sorthog. Dr. Nath did his M. Sc. and Ph. D. from Tezpur University. Prior to joining Barnagar College, he served for five years in the Department of Physics, Rajiv Gandhi University, Itanagar as Assistant Professor (Contractual). His research areas of interest are Theoretical High Energy Physics, Theoretical Condensed Matter Physics and Artificial Intelligence. He has published many research papers in different national and international journals as well as in edited books.



Dr. Sebika Kangsha Banik is working as an Assistant Professor in the Department of Physics, Barnagar College, Sorthog since September, 2019. She completed her M. Sc. and Ph. D. from the Department of Physics, Dibrugarh University. She is immensely engaged in both teaching and research activities and participated in several national and international workshops, conferences, seminars, webinars, FDPs, STCs etc. Her area of research is "Cosmology" and published number of research papers/articles in referred national and international journals as well as in edited books in her domain.


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Frontiers in Basic Physics and Applications

EDITED BY
KAMAL JYOTI NATH
DEBIKA KANGSHA BANIK
NAYAN MANI NATH
SEBIKA KANGSHA BANIK

Volume 1
Number 1
2020

Frontiers in Basic Physics and Applications

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$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

$$(i\hbar\gamma^\mu \nabla_\mu - mc)\psi = 0$$

$$\Delta x \Delta p \geq \frac{\hbar}{2}$$

$$H\psi = E\psi$$

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

$$F = ma$$

Kamal Jyoti Nath
Debika Kangsha Banik
Nayan Mani Nath
Sebika Kangsha Banik

This Edited Book is a collection of research papers/articles on the theme of “**Frontiers in Basic Physics and Applications**”. The book is intended for students, research scholars, academicians and planners who are interested and engaged in the field of Physics and its various applications.

Editors: **Kamal Jyoti Nath**
Debika Kangsha Banik
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Scotogenic Model and its Implication in Neutrino Physics and Related Cosmology: A Brief Overview

Lavina Sarma*, Bichitra Bijay Boruah and Mrinal Kumar Das
Tezpur University, Tezpur-784028, Assam, India

*Email: sarmalavina@gmail.com

Abstract

In this chapter we have discussed about the radiative generation of neutrino mass through scotogenic model. The scotogenic model proposed by Ernest Ma represents a minimal extension of Standard model(SM), in which small neutrino mass can be generated via radiative correction in the dark matter sector. This model is an attractive framework within which we can study a lot of unexplained phenomena related to neutrino mass as well as dark matter mass along with baryon asymmetry of universe (BAU) in Standard model of particle physics. One important insight we can draw from this model is that it provides a common framework where we can relate neutrino mass and dark matter. In this article we discussed different implications of scotogenic model.

Keywords: Scotogenic model, dark matter, baryon asymmetry, inert doublet.

1. Introduction

It is well known fact that, in the field of high energy physics (HEP), the standard model (SM) of particle physics has been a tremendous success and popular one. It is a compact theory for fundamental particles and their interaction. Discovery of Higgs boson in the year 2012 at the large hadron Collider (LHC) has added credence to the SM along with its ability of classifying the other known elementary particles of all the ideas upon which SM is built, the Gauge principle is the most important insight gained in Quantum Field Theory (QFT). The gauge group therefore representing the SM is $SU(3)_C \times SU(2)_L \times U(1)$. Again contradicting to the fact that the SM is theoretically self consistent. It has to face many anomalies as it fails in exploring the



Dr. Kamal Jyoti Nath is an Assistant Professor at the Department of Physics, Barnagar College, Sorthog. He did his Ph. D. from IIT Guwahati. He did his M. Sc. from Gauhati University and B. Sc and HS from Cotton College, Guwahati. He has qualified Joint Entrance Screening Test (JEST), Graduate Aptitude Test in Engineering (GATE), CSIR-NET and State Level Eligibility Test (SLET). His field of research interest is High Energy Physics. He has many quality publications in different national and international journals and books and participated in different national and international schools, workshops, seminars and conferences.



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Dr. Nayan Mani Nath is presently working as an Assistant Professor in the Department of Physics, Barnagar College, Sorthog. Dr. Nath did his M. Sc. and Ph. D. from Tezpur University. Prior to joining Barnagar College, he served for five years in the Department of Physics, Rajiv Gandhi University, Itanagar as Assistant Professor (Contractual). His research areas of interest are Theoretical High Energy Physics, Theoretical Condensed Matter Physics and Artificial Intelligence. He has published many research papers in different national and international journals as well as in edited books.



Dr. Sebika Kangsha Banik is working as an Assistant Professor in the Department of Physics, Barnagar College, Sorthog since September, 2019. She completed her M. Sc. and Ph. D. from the Department of Physics, Dibrugarh University. She is immensely engaged in both teaching and research activities and participated in several national and international workshops, conferences, seminars, webinars, FDPs, STCs etc. Her area of research is "Cosmology" and published number of research papers/articles in referred national and international journals as well as in edited books in her domain.


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Frontiers in Basic Physics and Applications

EDITED BY
KAMAL JYOTI NATH
DEBIKA KANGSHA BANIK
NAYAN MANI NATH
SEBIKA KANGSHA BANIK

Volume 1
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Frontiers in Basic Physics and Applications

$$E = h\nu$$

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$$(i\hbar\gamma^\mu \nabla_\mu - mc)\psi = 0$$

$$\Delta x \Delta p \geq \frac{\hbar}{2}$$

$$H\psi = E\psi$$

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

$$F = ma$$

Kamal Jyoti Nath
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Editors: **Kamal Jyoti Nath**
Debika Kangsha Banik
Nayan Mani Nath
Sebika Kangsha Banik

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Sterile Neutrino: A Fourth Flavor of Neutrino

Nayana Gautam* and Mrinal Kumar Das

Department of Physics, Tezpur University, Napaam,
Tezpur 784028, India

*Email: nayanagtm72@gmail.com

Abstract

We present a brief review of sterile neutrino with mass in eV and keV ranges. We first introduce the idea behind the existence of the fourth flavor of neutrinos. We study the phenomenological consequences of eV scale sterile neutrino in a model known as inverse seesaw (2,3). After reviewing the eV scale, we focus on the role of keV scale sterile neutrino in cosmology as well as particle physics. We discuss the keV scale sterile neutrino dark matter considering the constraints from cosmology and astrophysics. In support of the sterile neutrino dark matter concept, we present some crucial properties like relic abundance, decay rate, and active-sterile mixing in this study.

Keywords: Sterile neutrino, inverse seesaw, relic abundance, decay rate, active-sterile mixing.

1. Introduction

The Standard Model of particle physics has been highly successful, both theoretically and in confronting a wide range of experimental data. Regardless of its incredible success, it fails to address the neutrino oscillation phenomenon which is the origin of the idea behind the massive nature of neutrinos [1]. Moreover, the standard model has no explanation for the CP violation in the lepton sector, baryon asymmetry of the universe, and dark matter. These shortcomings provide reasons to expect physics Beyond Standard Model (BSM). There are several models proposed as an extension of the standard model which can explain the unsolved issues of the standard model. Most of the models have been devoted to explain the three neutrinos flavor oscillation established in many solar, reactor, and accelerator experiments. Later LSND [2] and MiniBooNE [3] experiments

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