

**ADIKAVI NANNAYA UNIVERSITY**

**University College of Science and Technology**

**Department Of Physics**



**Webinar Summary Report**

**“Current Trends and Opportunities in physics”**

**May 29, 2020**

**Convener: Y.Sushma Priya**

## ***Introduction***

The present webinar “Current trends and opportunities in physics” aims to inspire the students to pursue research and explore opportunities for nation building. Having different applications of physics in space, Nuclear, Astro, Molecular, atomic, Electronics and day to day life usage and they are dynamically changing according to the demands of present scenario, updating and upgrading is necessary in the field of physics. Current trends in physics provide a unique platform for Scientists, Researchers, Students and Academicians engaged in their respective fields.

The webinar was held on 29 May, 2020 4.30-7.30 pm. The webinar was attended by 300 participants plus 22 hosts/presenters. The Number of Participants report provides an overview of organizational and the expectations of the participants. The webinar was structures with an inaugural address by Vice-Chancellor; Two presentations, each followed by Q&A and a chat-based feedback collection from all the participants; and concluding remarks by the Registrar.

This Report presents a summary of the presentations and the discussions and feedback collected through Q&A on the presentations and the contents of the webinar

## ***Objective of the program***

The objective of the webinar is trying to fulfill the students and researchers with two eminent speakers: scientist from nuclear fuel complex, Department of atomic energy and an academician cum researcher from Kerala. It aims to inspire the students to pursue research and explore opportunities for nation building.

## Organizers



**ADIKAVI NANNAYA UNIVERSITY**  
**RAJAHMUNDRY - 533296**

One Day National Webinar  
on

**“CURRENT TRENDS AND OPPORTUNITIES IN PHYSICS”**

Organized by  
Department of Physics  
University College of Science & Technology  
ADIKAVI NANNAYA UNIVERSITY

**Chief Patron**

**Prof. Mokka Jagannadha Rao**  
Hon'ble Vice Chancellor, Adikavi Nannaya University,  
Rajamahendravaram

**Patrons**

**Prof. B. Ganga Rao**  
Registrar,  
Adikavi Nannaya University

**Dr. K. Ramaneswari**  
Principal, University College of  
Science and Technology

**Invited Speakers**

**Mrs. Meena Ravindran**  
DY.Chief Executive,  
Nuclear Fuel Complex,  
Departments of Atomic Energy  
Government of India

**Dr. Renjith Thomas**  
Assistant Professor of Chemistry  
St. Berchmans College  
kerala

**Convener**

**Mrs. Y. Sushma Priya**  
Course Coordinator

**Co - Conveners**

**Mr. N. S. SubbaRao,**  
**Dr.S. Rajyalakshmi,**  
**Mr. V. Rajasekhar**

## ***Resource persons***



**Mrs. Meena Ravindran**  
Deputy Chief Executive,  
Nuclear fuel complex  
Department of atomic energy  
Government of India



**Dr. Renjith Thomas**  
Assistant Professor,  
Department of Chemistry  
St. Berchman's college  
Kerala

## ***Brief Bio-data of resource persons***

### **About Meena Ravindran :**

Mrs. Meena Ravindran graduated in Chemical Engineering from Osmania University in 1982 with distinction. Though she was selected and joined the Indian Institute of Science, Bangalore for M.Tech in Chemical Engineering, she discontinued because, within few months she got selected to the 26th batch of BARC training school of Department of Atomic Energy, one of the most prestigious organizations involved in R & D and production in the high-end Nuclear Technology field.

Before taking a transfer to Nuclear Fuel Complex Hyderabad, she worked in Heavy Water Division in BARC for design of the distillation columns for Heavy water upgradation and design of tritium separation plant etc. For the first 10 years in NFC, she worked in the Process and Equipment development group where she developed the department's first ever industrial scale graphite coating and baking equipment for coating the ID of the small diameter zircaloy fuel tubes. During this period she also developed the alternate route of AUC for production of Uranium Oxide fuel powder at a pilot plant scale.

Her next assignment was commissioning of a high capacity Uranium Oxide powder production plant. She completed this task successfully and also productionized the plant. Later, the UO<sub>2</sub> pellet production plant also was added to her

responsibilities. She worked there for another 14 years. Next, she moved to the zirconium metal production group where she headed the chemical and metallurgical plants which produced nuclear grade Zirconium oxide and zirconium metal sponge respectively.

At present she is heading the Zirconium fuel tube and components fabrication group. Here she is in charge for producing zircaloy tubes meeting the complete requirement for all the nuclear reactors of the country. Apart from these tubes, she was also involved in the development of the process for production of special tubes for strategic applications of the country and is presently in charge of the team for bulk supply of the high quality tubes to BARC.

She was nominated to attend a management programme at Harvard University based on her excellent performance in a management course conducted by ASCI, Hyderabad. She has been awarded on quite a few occasions by the department and the unit for various significant contributions through her course of work.

She is a Life member of many institutions including Indian Institute of Chemical Engineers, Indian Nuclear Society, Women in Nuclear-Global, Powder Metallurgy Association of India, Indian Women Scientists Association and so on. She has published good number of papers in India and abroad on various 'Nuclear Fuel production' and 'Equipment design', Zirconium Production, Effluent management in Chemical plants & related topics.

She was the Chairperson of the Women's Cell of NFC representing about 400 women of NFC for many years, giving commendable service to the ladies of her organization.

Apart from these scientific and technological pursuits, she is very prominent in many social activities in her organization as well as other social groups. She is very passionate about plastic avoidance and other Swatch Bharat activities. She is in the forefront as part of the Alumni of both, her Atomic Energy Central School as well as OU Chemical Technology College in various programme of giving back to the Alma mater.


## About Dr RENJITH THOMAS :

Dr. Renjith Thomas is well known personality in the field of Theoretical Chemistry. He got his Doctorial degree from Bharathidasan University Kerala. He received gold medal from Gandhigram rural university in post graduation. He is a good academician with 18 years of teaching experience.

### **Achievements:**

- He published 39 SCI journals with a good impact factor and communicated more
- He is the reviewer of many reputed journals
- He is member of many professional bodies like Indian American society, International Association of advancements in materials etc.
- He conducted many conferences and seminars in the field of computational chemistry.
- He received young scientist award in 2002 at tropical botanical garden and research Institute (TBGRI)
- He is the visiting Teaching fellow of Indian academy of sciences at IISC Bangalore

## *Flyer*

 <p style="text-align: center;"><b>ADIKAVI NANNAYA UNIVERSITY</b> <b>RAJAHMUNDRY - 533296</b></p> <p style="text-align: center;">One Day National Webinar on <b>"CURRENT TRENDS AND OPPORTUNITIES IN PHYSICS"</b></p> <p style="text-align: center;">Organized by Department of Physics University College of Science &amp; Technology ADIKAVI NANNAYA UNIVERSITY</p> <p style="text-align: center;"><b>Chief Patron</b></p> <p style="text-align: center;"><b>Prof. Mokka Jagannadha Rao</b> Hon'ble Vice Chancellor, Adikavi Nannaya University, Rajamahendravaram</p> <p style="text-align: center;"><b>Patrons</b></p> <p>Prof. B. Ganga Rao Registrar, Adikavi Nannaya University</p> <p>Dr. K. Ramaneswari Principal, University College of Science and Technology</p> <p style="text-align: center;"><b>Invited Speakers</b></p> <p>Mrs. Meena Ravindran DY.Chief Executive, Nuclear Fuel Complex, Departments of Atomic Energy Government of India</p> <p>Dr. Renjith Thomas Assistant Professor of Chemistry St. Berchmans College kerala</p> <p style="text-align: center;"><b>Convener</b></p> <p>Mrs. Y. Sushma Priya Course Coordinator</p> <p style="text-align: center;"><b>Co - Conveners</b></p> <p>Mr. N. S. SubbaRao, Dr.S. Rajyalakshmi, Mr. V. Rajasekhar</p>	<p style="text-align: center;"><b>Schedule</b> <b>29<sup>th</sup> MAY 2020</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;"><b>4:30pm</b> <b>Inaugural Address</b> Prof. Mokka Jagannadha Rao, Hon'ble Vice-Chancellor, Adikavi Nannaya University, Rajamahendravaram.</p> </td> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;"><b>4:45pm – 5:30pm</b> <b>Invited speaker 1</b> Dr. Renjith Thomas, Assistant Professor of Chemistry, St. Berchmans College Kerala.</p> </td> </tr> <tr> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;"><b>5:45pm – 6:45pm</b> <b>Invited speaker 2</b> Mrs. Meena Ravindran, DY.Chief Executive, Nuclear Fuel Complex, Department of Atomic Energy, Government of India</p> </td> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;"><b>7:00pm</b> <b>Concluding Remarks</b> Prof. B.Ganga Rao, Registrar, Adikavi Nannaya University, Rajamahendravaram.</p> </td> </tr> </table> <p><b>About the Webinar:</b></p> <p>The Covid-19 lockdown has brought us to a standstill in our academic and professional activities. However the online tools/software available provide us an opportunity to create a platform in sharing our knowledge and transfer of information. The present webinar is one such effort to interlink academics &amp; research through eminent speakers in these fields. It aims to inspire the students to pursue research and explore opportunities for national building.</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 33%;">Webinar Date &amp; Time 29<sup>th</sup> May, 2020 @ 4:30 PM</td> <td style="width: 33%;">Registration Fee Free</td> <td style="width: 33%;">Mode of delivery Live web session</td> </tr> </table> <ul style="list-style-type: none"> <li>• Participants will be provided e-certificates</li> <li>• Contact : +91 9182183807</li> <li>• Click here to register.</li> </ul> <p>To Click here to register: <a href="https://forms.gle/o33rj3qTg3tYCvbN6">https://forms.gle/o33rj3qTg3tYCvbN6</a></p>	<p style="text-align: center;"><b>4:30pm</b> <b>Inaugural Address</b> Prof. Mokka Jagannadha Rao, Hon'ble Vice-Chancellor, Adikavi Nannaya University, Rajamahendravaram.</p>	<p style="text-align: center;"><b>4:45pm – 5:30pm</b> <b>Invited speaker 1</b> Dr. Renjith Thomas, Assistant Professor of Chemistry, St. Berchmans College Kerala.</p>	<p style="text-align: center;"><b>5:45pm – 6:45pm</b> <b>Invited speaker 2</b> Mrs. Meena Ravindran, DY.Chief Executive, Nuclear Fuel Complex, Department of Atomic Energy, Government of India</p>	<p style="text-align: center;"><b>7:00pm</b> <b>Concluding Remarks</b> Prof. B.Ganga Rao, Registrar, Adikavi Nannaya University, Rajamahendravaram.</p>	Webinar Date & Time 29 <sup>th</sup> May, 2020 @ 4:30 PM	Registration Fee Free	Mode of delivery Live web session
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***Program Sheet***

**Adikavi Nannaya University, Rajamahendravaram  
Department of PHYSIS**

**Webinar on “Current trends and opportunities in physics”**

**29-05-2020 at 4.30 pm**

- 1 Invitation
- 2 Prayer : University Invocation Song
- 3 Welcoming address by the convenor : Mrs.Y.Sushma Priya
- 4 Introducing Hon’ble VC : Dr.K.Ramaneswari,  
Principal, UCST
- 5 Address by Chief Guest Hon’ble VC : Prof.M. Jagannadha Rao,  
Hon’ble Vice Chancellor,  
ANUR
- 6 Introducing Invited speaker 1 : Dr.S.Rajyalakshmi  
Dr. Renjith Thomas
- 7 Address by the Invited speaker 1 : Mrs.Meena Ravindran
- 8 Introducing Invited speaker 2 : Mr.N.S.Subbarao  
Mrs.Meena ravindran
- 9 Address by the Invites speaker 2 : Dr.Renith Thomas
- 10 Concluding remarks : Prof.B.Ganga rao  
Registrar,ANUR
- 11 Vote of thanks : Mr.V.Rajasekhar
- 12 National Anthem

### ***Abstract of Lecture-I details:***

The talk by ***Smt Meena Ravindran*** covered the topic:

#### **Oppurtunities in PHYSICS and other related fields**

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It is observed that awareness about the mandate and activities of the Department of Atomic Energy, India needs to be enhanced among the students in the many colleges in the country. DAE has been conducting outreach programmes to increase the awareness among the scientific academia so that carrier opportunities in this area are also made known to the young and bright minds. The students as well as the country stand to gain immensely if the students get attracted to work and contribute in this highend S&T area.

In line with this motto, a talk was delivered by Smt. Meena Ravindran, Outstanding Scientist, NFC, Hyderabad through Webinar on 29<sup>th</sup> May, 2020 on the request of Smt.Y. Sushma Priya, department of physics , Adikavi Nannaya University, Rajamahendravaram About 400 students participated in the Webinar.

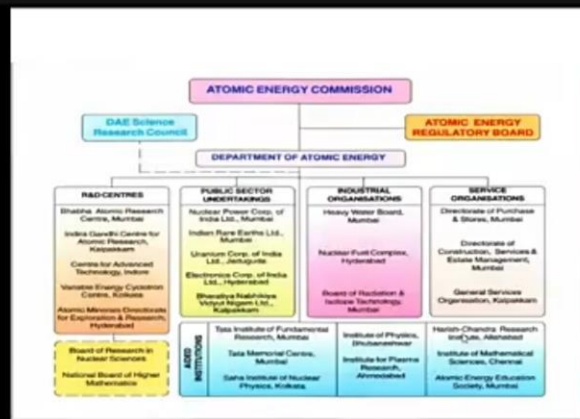
Smt Meena Ravindran spoke in detail about the Nuclear power generation activities and deliverables of DAE and particularly about Nuclear Fuel Complex, presently the only nuclear fuel production unit of the DAE situated at Hyderabad, which manufactures and supplies nuclear fuel to all the 14 Pressurized Heavy Water Reactors and 2 Boiling Water Reactors of the country. She explained the structure and the activities of various Units under the Department of Atomic Energy, including R&D units, fuel, heavy water and isotope production units, the uranium, zirconium and other rare earths exploration mining and refining activities, and academic centres for research in high end science and technology, service facilities like ECIL etc. The exclusive and significant societal contributions of the department especially in the medical field, farming sector, waste management, development and deployment of special security systems, Research and production activities in support to other departments like Space and Defense, contribution to international collaborative research in the field of fusion technology etc were also highlighted by her.

She concluded with information about the carrier opportunities available especially for Post Graduates in Physics, Chemistry and few in Biology and Graduates and post graduates in Engineering & Technology, research opportunities for furthering their careers etc.

**Shri RVRLVisheshwara Rao**, DGM, Environment and Pollution Control & Effluent Management group, NFC and **Shri Ravi Kanth**, Mgr, Zirconium Oxide



**Production Plant, NFC** also participated in Webinar along with Smt. Meena Ravindran. They were quick to answer the questions raised by the students promptly even as Webinar was proceeding. Later on also students approached them on e-mail and the same were answered.



Emoluments During Training	
<b>Stipend</b>	: Rs. 35000/- P.M.
<b>Book Allowance</b>	: Rs. 10000/- ONE-TIME
<b>Accommodation</b>	: OCS-at DAE Hostel <b>Mandatory</b> : DGFS-at IIT Hostel <b>Mandatory</b>
Structure of Course	
<b>Nuclear Related</b>	: 30%
<b>Discipline Specific</b>	: 30%
<b>Project (12 Weeks)</b>	: 30%
<b>Vacation (4 Weeks)</b>	: 10%
Assessment	
<b>Examinations</b>	: After Every 6 Weeks
<b>Course Viva-Voce</b>	: After Every 12 Weeks
<b>Project Viva-Voce</b>	: After 5 Weeks & Final

Opportunities in DAE

## ***Abstract of Lecture-II details***

The talk by ***Dr. Renjith thomas*** covered the topic:

### **Recent trends in PHYSICS and other related fields**

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Heterocyclic compounds present a high degree of structural assortment and are provide to be largely and efficiently useful like therapeutic agents. Heterocyclic compounds played a vital role in biological processes and are wide spread as natural products. Additionally some vitamins, proteins, hormones contain aromatic heterocyclic system. Synthetically produced heterocycles are useful in many applications like agrochemicals and pharmaceuticals and play an important role in human life. Heterocycles have enormous potential as the most promising molecules of lead structures for the design of new drugs.

Heterocyclic compounds are a structurally fascinating and practically significant class of compounds that have attracted attention for their pharmacological and other important properties. The most powerful computational technique is Density functional theory (DFT) for the structure determination. In this approach numerous exchange-correlation functionals withzBecke-3-Lee-Yang-Parr (B3LYP) be commonly used and established to be effective for the calculation of vibrational spectra and additionally, it can calculate the electronic properties using molecular orbital approximations, thermodynamical properties, etc. Generally, the frequencies generated from the density functional theory calculations are overvalued than the investigational calculations. Theoretical measurements can be minimized by the scaling process by performing the ab initio calculation.

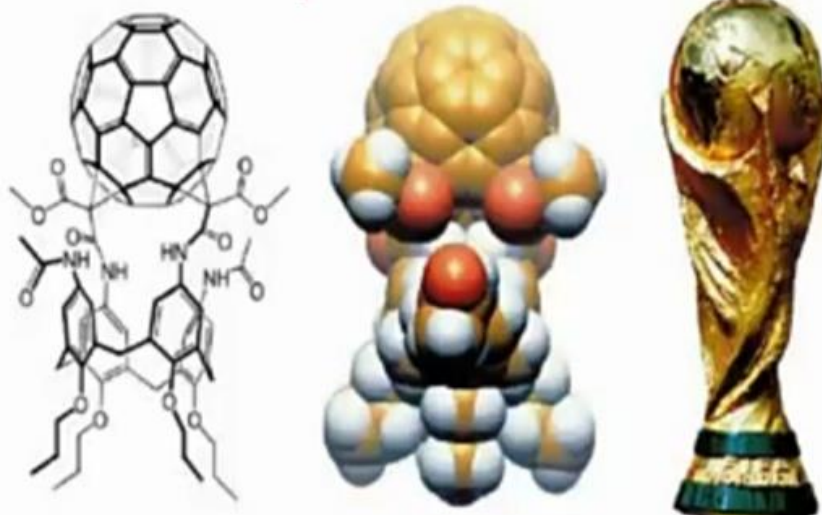
Non covalent interaction analysis provided various types of interactions present in the molecule. Molecular docking studies will discover the drug analysis of the compound. He also mentioned the collaborators and the publications in that area. He answered the questions raised by the students promptly, Later on also students approached on e-mail and the same were answered.

## Overview of Methods

- **Molecular mechanics, force fields**
  - easy to comprehend
  - quickly programmed
  - extremely fast
  - no electrons: limited interpretability
- **Semiempirical methods**
  - quantum method
  - valence electrons only
  - fast
  - limited accuracy
- ***ab initio* methods**
  - full quantum method
  - only experimental fundamental constants
  - in principle very high accuracy
  - complete (all interactions are included)
  - very time consuming ("expensive")
  - systematic improvement possible
- **Density Functional Theory**
  - quantum method
  - in principle "exact"
  - faster than traditional *ab initio*
  - variable accuracy
  - no systematic improvement

Physics National Webinar @ Adikavi Nannaya Univeristy

## Dr. Renjith Thomas presentation



Physics National Webinar @  
Adikavi Nannaya Univeristy

## *Number of participants*

A total number of 694 participants have registered for this event across the India. In that 50 participants interlinked with Google meet and remain linked with you tube live.

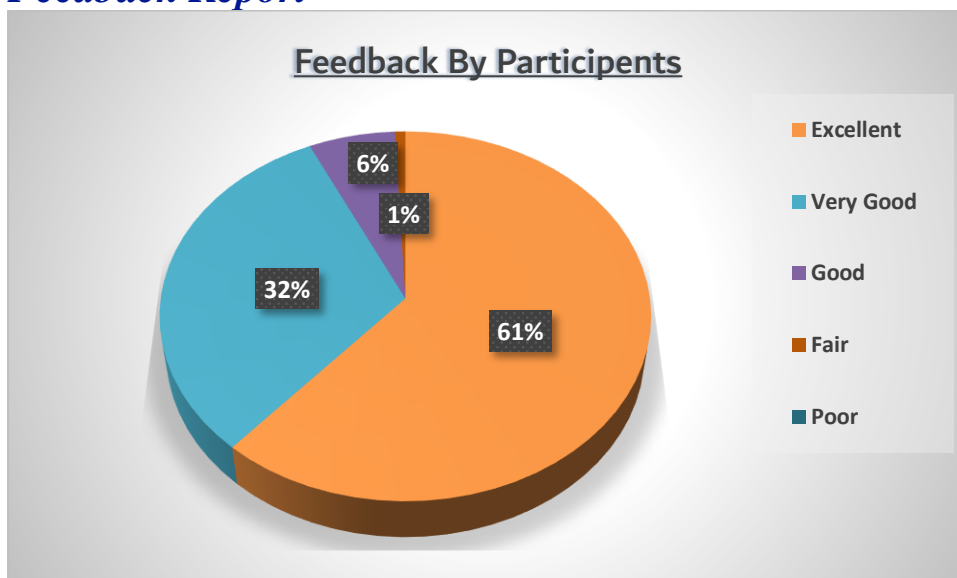
Countries(07)	India(688) Omen(1) Zambia(1) Texas(1) China(1) Singapore(1) U.T.puduchery(1)
States	Andhra Pradesh(442)
	Telangana(15)
	Kerala(8)
	Karnataka(8)
	Delhi(1)
	Maharashtra(1)
	Gujrat(1)
	Madhyapradesh(1)
	Tamilnadu(208)
	Uttarpradesh(1)
	Punjab(1)

## *Outcome of the Event*

The exclusive and significant societal contributions of the physics especially in the medical field, farming sector, waste management, development and deployment of special security systems, Research and production activities in support to other departments like Space and Defense, contribution to international collaborative research in the field of fusion technology etc were highlighted. Resource persons concluded with information about the carrier opportunities available especially for Post Graduates in Physics, Chemistry and few in Biology and Graduates and post graduates in Engineering & Technology, research opportunities for furthering their careers etc.

“The faculty and students appreciated the information shared and showed keen interest to know more detailed information on specific topics. Over all, the Webinar was a huge success from the point of view of awareness building about the DAE and also as one of the first attempts by the University on conducting such a Webinar.”

## Feedback Report



## e-Certificate



**ADIKAVI NANNAYA UNIVERSITY**  
**RAJAHMUNDRY - 533296**



**CERTIFICATE**

**Webinar on “CURRENT TRENDS AND OPPORTUNITIES IN PHYSICS”**

Dr./Ms./Mr. ----- from the organization ----- has participated in the one day webinar on “ Current Trends and Opportunities in Physics”, conducted by the department of Physics, Adikavi Nannaya University on a virtual platform.

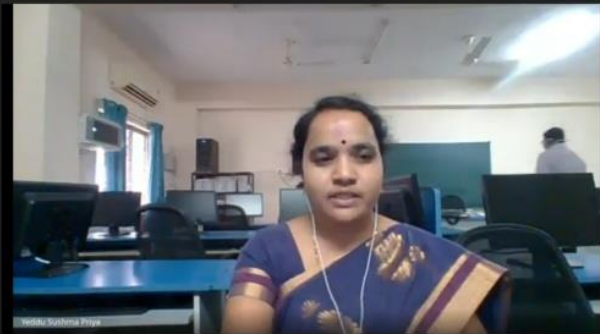
  
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 Convener

  
**Dr. K. Rameswari**  
 Principal, University College of  
 Science & Techonology.

  
**Prof. B. Ganga Rao**  
 Registrar,  
 Adikavi Nannaya University.

*Photo Gallery with Captions and Paper clippings*





Convenor's Report



Introduction to  
Dr.Renjith Thomas  
by Dr.S.Rajyalakshmi



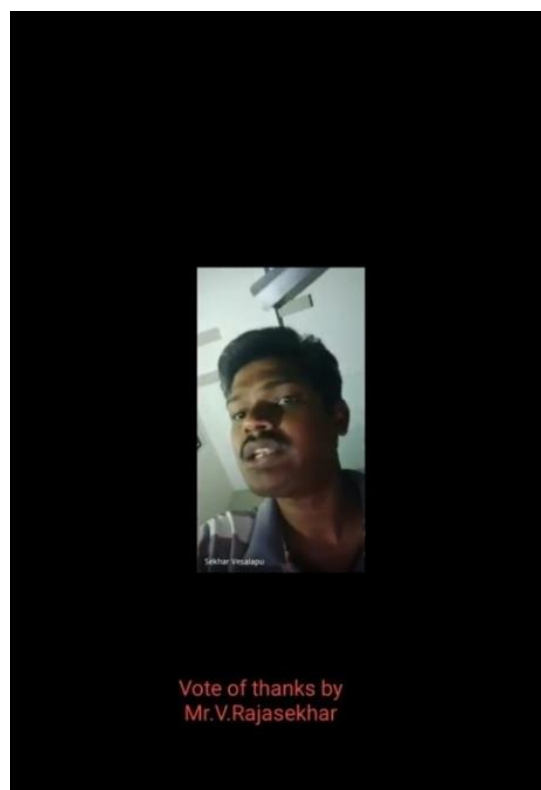




Mrs.Meena Ravindran Talk



Mr.Visweswararao,  
Deputy Manager NFC  
Interactive session



**◆ సైన్స్ అండ్ టెక్నాలజీలో ఫిజిక్స్ అమ్మలాంటిది**

నన్నయ విశ్వవిద్యాలయం(రాజానగరం), న్యూస్టుడె: శాస్త్ర సాంకేతిక రంగాల్లో ఫిజిక్స్ అమ్మవంటిదని నన్నయ విశ్వవిద్యాలయ ఉపకులపతి ఆచార్య ఎం.జగన్నాథరావు పేర్కొన్నారు. యూనివర్సిటీ కాలేజ్ ఆఫ్ సైన్స్ అండ్ టెక్నాలజీలోని డిపార్ట్మెంట్ ఆఫ్ ఫిజిక్స్ ఆధ్వర్యంలో శుక్రవారం ఆన్లైన్ వెబినార్ను నిర్వహించారు దీనికి వై.సుబ్బప్రియ కన్వీనర్గా వ్యవహరించారు. డిపార్ట్మెంట్ ఆఫ్ ఆటోమిక్ ఇంజనీర్ గవర్నమెంట్ ఆఫ్ ఇండియా ఉన్నతాధికారి మీనా రమేంద్రన్, ఆసి స్టెంట్ ప్రొఫెసర్ డాక్టర్ రంజిత్ ఛామన్(కేరళ బౌతికశాస్త్రంలోని ప్రస్తుత పోకడలపై చర్చించారు.

Date : 30/05/2020 EditionName :  
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**సైన్స్ టెక్నాలజీలో ఫిజిక్స్ అమ్మవంటిది**

దివాన్చెరువు, మే 29: శాస్త్ర, సాంకేతిక రంగాల్లో బౌతిక శాస్త్రం అమ్మవంటిదని, అన్ని శాస్త్రాల్లో దాని పాత్ర ఉంటుందని ఆదికవి నన్నయ విశ్వవిద్యాలయం ఉప కులపతి ఆచార్య ఎం.జగన్నాథరావు అన్నారు. యూనివర్సిటీ కాలేజ్ ఆఫ్ సైన్స్ టెక్నాలజీ కళాశాలలోని ఫిజిక్స్ విభాగం ఆధ్వర్యంలో 'బౌతిక శాస్త్రంలో అవకాశాలు-ప్రస్తుత పోకడలు' అంశంపై శుక్రవారం ఆన్లైన్ వెబినార్ నిర్వహించారు. వై.సుబ్బప్రియ కన్వీనర్గా వ్యవహరించిన సదస్సులో వీసీ మట్టాడుతూ న్యూక్లియర్ ఫిజిక్స్, పెన్ట్రో ఫిజిక్స్, మాలిక్యులర్ ఫిజిక్స్, ఎటమిక్ ఫిజిక్స్, ఎలక్ట్రానిక్స్ వంటి అన్ని రంగాల్లో ఫిజిక్స్ పాత్ర ఉంటుందని చెప్పారు. ఫిజిక్స్లో పట్టు సాధిస్తే మెరుగైన ఉద్యోగావకాశాలు లభిస్తాయని తెలిపారు.

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