



# SOCIETY ACTIVITY REPORT 2017-2018

## PHYSICS SOCIETY

### ❖ FLAGSHIP EVENTS OF PHYSICS SOCIETY (2017-18)

#### 1) Popli Memorial Lecture Series( 2020-21)

Title: Fluctuations and Order

Speaker: Prof. Mustansir Barma, TIFR Centre for Interdisciplinary Sciences, Hyderabad.

Date: 21-23 March 2018

**22nd POPLI MEMORIAL LECTURE SERIES**

## **FLUCTUATIONS AND ORDER**

**PROF. MUSTANSIR BARMA** **12:30 PM**

Tata Institute of Fundamental Research  
TIFR Centre for Interdisciplinary Sciences, Hyderabad **NPLT**

Fluctuations -- that is, deviations from the average -- often tell more about a system than do the average values themselves. They can play a role in bringing about the remarkable universality observed near the critical points of many systems. Further, ordering might be destroyed when fluctuations are as large as the average but there exist many interesting exceptions.

<b>MARCH 21</b>	The first lecture will focus on historical examples and how fluctuations determine the way a system would respond to change, without having to implement the change.
<b>MARCH 22</b>	The second lecture will introduce order, entropy, and the role of fluctuations in bringing about universal properties.
<b>MARCH 23</b>	The third lecture will focus on systems that are exceptions in maintaining order even when fluctuations are as large as the average.

Arshdeep +91 8930771641 THE PHYSICS SOCIETY, ST. STEPHEN'S COLLEGE Abhinav +91 8604403859



## **2) Meera Memorial Paper Reading Competition (2017-18)**

Date: 10-11th January 2018

### **Meera Memorial Paper Reading Competition**

The prestigious annual competition where students from a scientific background present a paper on a topic of their choice. They may choose to present research projects, term projects or their individual insights into a particular subject. Students from both Bachelors and Masters degree are eligible.

#### **Rules for the competition**

1. The presentation may be by an individual or in groups of two.
2. Participants will be given a time slot of 15 mins. The presentation will be for 12 mins which includes set up time. This will be followed by a 3 min Q/A session.
3. You can choose to present using a powerpoint presentation or a black board.
4. All the power point presentations must be emailed to the address given below before hand.
5. **The participants will be judged on the basis of:**
  - The Presentation
  - The Content
  - Ability to answer the questions
6. Walk in entries are allowed.

You can register by sending us a mail to:  
[physics.stephens@gmail.com](mailto:physics.stephens@gmail.com)

January 10 and 11, 2018  
**Venue:** NPLT, Science Block, St. Stephen's College  
Time slots for presentations will be informed later.

**For any queries contact:**  
Arshdeep Kaur: 8930771641  
Abhinav Prakash Gupta: 8604403859

*Rules of Meera Memorial Paper Reading Competition 2017-18*



### 3) Popli Memorial Aptitude Test (2017-18)

- Date: 16 March 2018
- 1 hour long aptitude test on Physics for students of all three years.



#### Popli Memorial Aptitude Test || March 16, 2018

1 message

Physics Society <physics.stephens@gmail.com> Wed, Mar 7, 2018 at 8:56 PM  
To: Abhinav Gupta <abhinav.r.gupta@gmail.com>  
Bcc: Abhijith Paul <paulabhijith@gmail.com>, Aditya Singh Shekhawat <adisshekhawat@gmail.com>, Aiswarya Aju <aiswarya.aju@gmail.com>, Ananya George <ananyageorge1997@gmail.com>, Anuj Kumar Singh <kanuj195@gmail.com>, Arel Murnu <rl.murnu@gmail.com>, Arunima <arukundu3199@gmail.com>, Chelsea Maria John <chelseamariajohn@gmail.com>, Chris Abraham <chris.phy98@gmail.com>, Danny Matthew <dannymatthew@gmail.com>, Divya Thomas <divya1231810@gmail.com>, Eelena Gupta <eelena.gupta@gmail.com>, Elma Joshy <elmajoshy981@gmail.com>, Evita Merin <merinrose1998@gmail.com>, Garvit Bajaj <bajaj.garvit@gmail.com>, Grace Monica S Mehta <gracemehta98@gmail.com>, Gurprej Singh <sidhugurprej786@gmail.com>, Hanna Elsa <hannaelsa98@gmail.com>, Izabel Thomas <izabelth@gmail.com>, Kapil Goswami <kgoswami33@gmail.com>, Lalzara <rv643@gmail.com>, Meghan Phillip Alancheril <mehphilip@outlook.com>, Milton E Peter <miltonerestpeter@gmail.com>, Mona Kumari <kumarimona1810@gmail.com>, Nandana Bhattacharya 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Dear All,

The Popli Memorial Aptitude test will be conducted on **Friday, March 16, 2018 at 12:30 PM** in the NPLT. It will test your aptitude in different areas of Physics covered over the three years.

Students from all three years are eligible and encouraged to participate. Hope to see you there

All the best!  
The Physics Society

*Mail sent to students of Physics of all three years*

### ❖ Club sessions and talks under Physics Society

The Society consists of three clubs, namely, the Feynman Club, Astronomy Club and Problem Solving Club. Talks under the Feynman club (called Feynman Talks) are



delivered by scholars and academics in the field of Physics. Sessions in Astronomy and Problem solving Club are conducted by the student members of the society.

➤ **Feynman Club lectures**

<b>Date</b>	<b>Speaker</b>	<b>Title of Talk</b>
28/07/2017	Prof. Amartya Sengupta	THz Imaging and Spectroscopy : A picture says a thousand words
04/08/2017	Prof. Varsha Banerjee	Nanoheaters for Therapeutic Applications
10/08/2017	Dr. Ananthan Nambiar	Analyzing the Presence of Terrorist Organization on Twitter
11/08/2017	Mrittunjoy Guha Majumdar	Quirks of the Quanta
15/09/2017	Prof. M. Sami	Our Expanding and Accelerating Universe
13/10/2017	Prof. A. G. Vedeshwar	Superconductivity : A Century Old Challenge Still Clueless ?





## The Feynman Club

St. Stephen's College



invites you for a talk titled

### THz Imaging and Spectroscopy: A picture says a thousand words

by

**Amartya Sengupta**

IIT Delhi

#### Abstract

If seeing is believing, and a picture says a thousand words, then evidently, the emerging area of THz spectroscopy and imaging is the new technician in nature's photo-studio. For most of the past century, terahertz (THz) frequencies of electromagnetic radiation (approx. 100 GHz to 10 THz) were mostly referred to as sub-millimeter or far-infrared waves and were principally used by the astronomers and very select groups of spectroscopists. However, with the advent of laser based THz time domain spectroscopy in last two decades of the past century, THz technology has rapidly carved its niche in myriad areas of applications. In fact, THz technology has been promoted as one of the disruptive technologies changing the world. Specifically, with the availability of THz commercial systems as research spin-offs, non-invasive THz imaging has become an effective tool of application in many industrial and research sectors.

In this talk I will present the basics of this field and how it relates to very fundamental scientific breakthroughs leading to very modern cutting edge applications in areas such as personnel and package screening, medical diagnostics or structure/material inspection. THz radiation with its unique combination of penetrability, specificity and safety features is a very promising candidate for next generation technological approaches in all the above sectors. At the end, I will highlight some of the fundamental research and innovative engineering in this area and the continuing effort to identify more compact, powerful sources and detectors in THz range.

**Date:** Friday July 28, 2017.

<thomasfrancis96@gmail.com>, Vasudha Singh <vasudhasinghbarcelona@gmail.com>, vinay gusain <gusainvin96@gmail.com>, vivek titus <vivek7titus@gmail.com>, Jacob Cherian <jacob1.cherian@gmail.com>, Bikram Phookun <bphookun@yahoo.com>, Sangeetha Sachdeva <sangeeta.s21@gmail.com>, Sanil Unnikrishnan <sanil.unni@gmail.com>, Abhinav Gupta <fbirebundle@gmail.com>, Geetanjali Sethi <getsethi@gmail.com>, Chinkhanlun Guite <ckguit@ststephens.edu>, Anne Masih <mashanne7@gmail.com>

## The Feynman Club

St. Stephen's College



invites you for a talk titled

### Nanoheaters for Therapeutic Applications

by

**Varsha Banerjee**

IIT Delhi

#### Abstract

The last decade has revealed the tremendous potential of magnetic nanoparticles (MNPs) for therapeutic applications. The main reasons are the ease with which they can be detected and manipulated by external magnetic fields, and their ability to dissipate heat on application of an oscillating magnetic field. Therefore when targeted on malignant tumour cells, MNPs have the ability to destroy them. This effect is called magnetic hyperthermia in the medical literature. Living cells capture and internalize MNPs, concentrating them into intracellular vesicles called lysosomes. As a consequence, they interact via dipole-dipole coupling which modifies the magnetic properties of the micron-sized assembly. We explore the role played by long-ranged dipolar interactions on morphologies and heat dissipation in these tiny heaters and identify efficient protocols for apoptosis. Our results could motivate new strategies to optimise magnetic hyperthermia.

**Date:** Friday August 4, 2017.

**Venue:** NPLT

**Time:** 12:30 PM

The Physics Society

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To: [physics.stephens@gmail.com](mailto:physics.stephens@gmail.com)

Tue, Aug 1, 2017 at 9:56 PM

<thomasfrancis96@gmail.com>, Vasudha Singh <vasudhasinghbarcelona@gmail.com>, vinay gusain <gusainvin96@gmail.com>, vivek titus <vivek7titus@gmail.com>, Jacob Cherian <jacob1.cherian@gmail.com>, Bikram Phookun <bphookun@yahoo.com>, Sangeetha Sachdeva <sangeeta.s21@gmail.com>, Sanil Unnikrishnan <sanil.unni@gmail.com>, Abhinav Gupta <fbirebundle@gmail.com>, Geetanjali Sethi <getsethi@gmail.com>, Chinkhanlun Guite <ckguit@ststephens.edu>, shruti.thkr@gmail.com, rekha111gupta@yahoo.com

## The Feynman Club

St. Stephen's College



invites you for a talk titled

### Quirks of the Quanta

by

**Mrityunjay Guha Majumdar**

Cavendish Laboratory, University of Cambridge

#### Abstract

The world of quantum physics is a riveting domain that is composed of oft-counterintuitive ideas and fascinating applications, be it teleportation, ghost imaging and cryptography. Mrityunjay will be briefly looking into this engrossing realm, before traipsing into the conceptual alley of quantum entanglement and its relevance for quantum computation. With IBM, Microsoft, Google, Hitachi and Toshiba in the fray to make the first quantum computer, the paradigm of quantum Computation truly brings the power of physics to a whole new level in the contemporary world.

**Date:** Friday August 11, 2017.

**Venue:** NPLT

**Time:** 12:30 PM

The Physics Society

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Thu, Aug 10, 2017 at 1:08 AM

<tanmay2608@gmail.com>, Thangiam Rocket Singh <throcket007@gmail.com>, Thomas Francis <thomasfrancis96@gmail.com>, Vasudha Singh <vasudhasinghbarcelona@gmail.com>, vinay gusain <gusainvin96@gmail.com>, vivek titus <vivek7titus@gmail.com>, Jacob Cherian <jacob1.cherian@gmail.com>, Bikram Phookun <bphookun@yahoo.com>, Sangeetha Sachdeva <sangeeta.s21@gmail.com>, Sanil Unnikrishnan <sanil.unni@gmail.com>, Abhinav Gupta <fbirebundle@gmail.com>, Geetanjali Sethi <getsethi@gmail.com>, Chinkhanlun Guite <ckguit@ststephens.edu>, Shruti Thakur <shruti.thkr@gmail.com>, rekha111gupta@yahoo.com, Santhust <santhust31@gmail.com>

## The Feynman Club

St. Stephen's College



invites you for a talk titled

### Our Expanding and Accelerating Universe

by

**M. Sami**

Centre For Theoretical Physics, Jamia Millia Islamia

#### Abstract

In this presentation, prepared for a general audience, we argue that Newtonian framework applied to Universe as a whole gives rise to evolving Universe. Using heuristic approach, we demonstrate that Einstein static Universe requires a positive cosmological constant. However, such a solution is unstable. We further show that the standard model of Universe a la hot big bang, being a successful framework, suffers from an inconsistency dubbed age problem. We show that the only resolution of the problem in the standard model is provided by late time cosmic acceleration. We then discuss the observational aspects and the possible underlying sources that could give rise to this phenomenon.

**Date:** Friday September 15, 2017.

**Venue:** NPLT



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## The Feynman Club

St. Stephen's College



invites you for a talk titled

### Superconductivity : A Century Old Challenge Still Clueless?

by

A.G. Vedeshwar

Thin Film Laboratory, Dept. of Physics and Astrophysics, Delhi University

#### Abstract

The phenomenon of superconductivity was first discovered experimentally in 1911, a century ago. Since then various developments both theoretically and experimentally have been witnessed in understanding this phenomenon. The development was extremely slow prior to 1986 and a rapid growth took place thereafter. This talk is aimed and intended to take young minds through a journey of development in understanding this phenomenon since its discovery and leave at the challenge that exists today. It is intended to discuss and appreciate the Physics behind this phenomenon at a sufficiently simple level.

**Date:** Friday October 13, 2017.

**Venue:** NPLT



Physics Society <physics.stephens@gmail.com>

Wed, Aug 9, 2017, 9:11 PM

to Abhijith, Aditya, Aiswarya, Ananya, Anuj, Arel, Arunima, Chelsea, Chris, Danny, Divya, Eleena, Elma, Evita, Garvit, Grace, Gurpej, Hanna, Izabel, Kapil, Lalzara, Mephin, Milton, Mona, Nanc

Dear all

You are invited to attend the talk on 'Analyzing the Presence of Terrorist Organization on Twitter' by Dr. Ananthan Nambiar on August 10, 2017 (Thursday) in the NPLT at 2 pm.

Please find attached the abstract for the talk.

The Physics Society

St. Stephen's College





➤ **Problem Solving Club**

Released 10 interesting yet accessible problems and their solutions throughout the year.

➤ **Other Events**

Date	Club	Speaker/Host	Topic
24/08/2017	Astronomy Club	Student Members	Introduction to various frontiers of Astronomy
05/01/2018	Astronomy Club	Student Members	Data Analysis in Astronomy
19/01/2018	Astronomy Club	Student Members	Image Stacking to detect faint astronomical sources

**NAAC  
Assessment  
and  
Accreditation 2021**



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**Physics Society** <[physics.stephens@gmail.com](mailto:physics.stephens@gmail.com)>

Thu, Aug 24, 2017, 10:06 PM



to Abhijith, Aditya, Aiswarya, Ananya, Anuj, Arel, Arunima, Chelsea, Chris, Danny, Divya, Eleena, Elma, Evita, Garvit, Grace, Gurpej, Hanna, Izabel, Kapil, Lalzara, Mephin, Milton, Mona, Nanc

Dear all

Astronomy Club invites you to a talk about the introduction to various frontiers of Astronomy by Abhishek Chakraborty on 25th August, 2017 (Friday) in the NPLT.

Please find attached the abstract for the talk.

With Best Regards

The Physics Society

