

Report on the  
**NATIONAL SEMINAR ON ADVANCES IN PHYSICS**  
(NSAP - 2019)

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*Venue:* EDUSAT Hall, Government College, Kariavattom, Thiruvananthapuram - 695 681

*Date :* 21 st and 22 nd November 2019

*No. of participants:* 120

**Day 1 - 21/11/2019**

**9:00 am**

Registration

**9:30 am**

Inaugural Session - The session was chaired by Prof. A. S. Jaya, the Head of the Department of Physics, and the conference was inaugurated by Dr. Ajithakumari B, the Principal of Government College Kariavattom.



**9:45 am - 11:15 am**

**Session 1**

Topic - **X-ray diffraction: Analysis of nanomaterials**

Presented by - Dr. Biju V, Department of Physics, University of Kerala

In this session, Dr. Biju presented an overview of the nanomaterials and then discussed the analysis of nanomaterials using X-ray diffraction. Properties of the XRD spectrum and reasons for peak broadening were discussed. Then, he moved on to the grain size determination using Scherrer equation. Towards the end he also gave an exposition on the Williamson-Hall analysis.

**11:30 am - 1:00 pm**

### **Session 2**

#### **Topic -X-ray photoelectron spectroscopy**

Presented by - Dr. Biju V, Department of Physics, University of Kerala

The first part of this session involved an overview of the surface characterization techniques, surface imaging and surface spectroscopy. The second part discussed X-ray photoelectron spectroscopy(XPS) in detail.

**1:30 pm - 3:00 pm**

### **Session 3**

#### **Topic -*Thermoelectrics Fundamentals and select research works - I***

Presented by - Dr. S R Sarath Kumar, Department of Nanoscience and Nanotechnology  
University of Kerala



**3:15 pm - 4:45 pm**

## Session 4

Topic - ***Thermoelectrics Fundamentals and select research works - II***

Presented by - Dr. S R Sarath Kumar, Department of Nanoscience and Nanotechnology  
University of Kerala

In Sessions 3 and 4, Dr. Sarath Kumar discussed fundamentals of thermoelectrics applied to the study of nanomaterials and then discussed some of the recent research work he conducted in this field.

Day 2 - 22/11/2019

9:30 am - 11:00 am

## Session 5

Topic - ***Gravity - Newton, Einstein and Beyond - I***

Presented by - Dr. Titus K Mathew, Department of Physics  
Cochin University of Science and Technology



11:15 am - 12:45 pm

## Session 6

Topic - ***Gravity - Newton, Einstein and Beyond - II***

Presented by - Dr. Titus K Mathew, Department of Physics  
Cochin University of Science and Technology

In sessions 5 and 6, Dr. Titus K Mathew discussed Einstein's theory of gravity as a manifestation of the geometry of the spacetime and moved on to the frontier research topics where a school of thought is that the temperature of the black hole horizon can be thought of originating from a possible microscopic, discrete, structure of the spacetime and gravity as an emergent phenomenon in the continuum limit of the spacetime.

**1:15 pm - 2:45 pm**

### **Session 7**

Topic - **Basics in Physics: Quantum and Classical - I**

Presented by - Dr. N Shaji, Adjunct Professor  
Cochin University of Science and Technology

**3:00 pm - 4:30 pm**

### **Session 8**

Topic - **Basics in Physics: Quantum and Classical - II**

Presented by - Dr. N Shaji, Adjunct Professor  
Cochin University of Science and Technology

In sessions 7 and 8, Dr. N Shaji discussed the fundamentals of classical and quantum physics and elaborated some quantum characteristics, like the quantum entanglement, that has no classical analogue.

**4:30 pm**

### **Valedictory Session**

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