

# Surya Sen Mahavidyalaya

NAAC ACCREDITED & Affiliated to University of North Bengal

[A Multi-stream Govt. Aided College & Recognized by  
UGC u/s 2(f) &12(b)]



## INTERNATIONAL WEBINAR

on

## CURRENT TOPICS IN EMERGING MAGNETIC MATERIALS

Organized by  
Department of Physics  
and IQAC,  
Surya Sen Mahavidyalaya

### ORGANIZING COMMITTEE:

CHIEF PATRON: **SJ JAYANTA MOULIK, PRESIDENT,**

#### GOVERNING BODY

PATRON: **DR P K MISHRA, PRINCIPAL**

COORDINATOR, IQAC: **DR ARNAB BAUL**

CONVENER: **DR ARINDAM KARMAKAR,**

ASSISTANT PROFESSOR AND D-I-C, DEPT. OF PHYSICS

#### MEMBERS:

**DR ROMYANI GOSWAMI, ASSISTANT PROFESSOR,**

DEPT. OF PHYSICS

**MR ARKAPRAYA MITRA, SACT, DEPT. OF PHYSICS**

**DR SOMA ADHIKARI, SACT, DEPT. OF PHYSICS**

TECHNICAL SUPPORT: **TECHNICAL COMMITTEE**

## 14 JULY 2021

### 10:30 AM ONWARDS

### RESOURCE PERSONS

**Dr Saurav Giri**

Professor and School Chair  
School of Physical Sciences,  
Indian Association for the Cultivation of  
Science, Jadavpur, Kolkata – 32



**Dr Souvik Chatterjee**

Scientist E,  
UGC-DAE Consortium for Scientific  
Research,  
Kolkata Centre, Saltlake, Kolkata- 700106



**Dr Rajib Batabyal**

Post-doctoral Fellow,  
Center for Quantum Devices,  
Niels Bohr Institute,  
University of Copenhagen, Denmark  
Also, Guest Researcher,  
Microsoft Quantum Materials Lab,  
Station Q – Copenhagen, Lingby, Denmark



**Dr Sumanta Chattopadhyay**

Research Fellow,  
Dresden High Magnetic Field  
Laboratory (HLD), Helmholtz-Zentrum  
Dresden-Rossendorf, e.V.(HZDR),  
Dresden, Germany



**Click here for Registration**

Platform:  **(LIVE STREAMING)**

# PROGRAMME SCHEDULE:

10:30 AM – 11:00 AM:

INTRODUCTION ABOUT WEBINAR BY DR ARINDAM KARMAKAR

WELCOME ADDRESS BY PRINCIPAL, DR P K MISHRA

ADDRESS BY PRESIDENT, GOVERNING BODY, SJ JAYANTA MOULIK

ADDRESS BY IQAC COORDINATOR, DR ARNAB BAUL

**SESSION CHAIR: DR ARINDAM KARMAKAR**

11:00 AM – 11:50 AM: PRESENTATION BY DR SAURAV GIRI

**TOPIC: DOES SIZE MATTER IN MAGNETISM?**

11:50 AM – 12:00 PM: QUESTIONS AND ANSWERS

12:00 PM – 12:50 PM: PRESENTATION BY DR SOUVIK CHATTERJEE

**TOPIC: MARTENSITIC TRANSITION ASSISTED MODIFICATION OF THE MAGNETIC STRUCTURE IN MAGNETIC EQUIATOMIC ALLOYS**

12:50 PM – 01:00 PM: QUESTIONS AND ANSWERS

01:00 PM – 02:00 PM: LUNCH BREAK

**SESSION CHAIR: DR SOMA ADHIKARI**

02:00 PM – 02:50 PM: PRESENTATION BY DR RAJIB BATABYAL

**TOPIC: DISCOVERY OF WEYL FERMIONS IN BAND TOPOLOGY**

02:50 PM – 03:00 PM: QUESTIONS AND ANSWERS

03:00 PM – 03:50 PM: PRESENTATION BY DR SUMANTA CHATTOPADHYAY

**TOPIC: DECODING EXOTIC FRUSTRATED MAGNETISM USING EXTREME-CONDITION-MAGNETOMETRY**

03:50 PM – 04:00 PM: QUESTIONS AND ANSWERS

04:00 PM – 04:10 PM: VOTE OF THANKS BY DR SOMA ADHIKARI, DEPT. OF PHYSICS, SSM

FORMAL CLOSING OF THE PROGRAMME

## Important Note

- REGISTRATION IS FREE & MANDATORY
- A LINK TO A WHATSAPP GROUP WILL BE DISPLAYED UPON SUBMISSION OF THE REGISTRATION FORM. KINDLY JOIN THE WHATSAPP GROUP FOR UPDATED INFORMATION ABOUT THE WEBINAR.
- LAST DATE OF REGISTRATION: 13/07/2021, TIME: 11:00 PM
- E-CERTIFICATE WILL BE ISSUED UPON ACTIVE PARTICIPATION. SUBMISSION OF FEEDBACK FORMS IN BOTH SESSIONS BY THE PARTICIPANTS IS MANDATORY FOR THE ISSUE OF CERTIFICATES

For any queries contact:

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e-mail: akarmakar@suryasencollege.org.in

# Details of Presentations

## MARTENSITIC TRANSITION ASSISTED MODIFICATION OF THE MAGNETIC STRUCTURE IN MAGNETIC EQUIATOMIC ALLOYS

DR. SOUVIK CHATTERJEE

### Brief abstract:

Magnetic equiatomic alloys (MEAs) of general formula  $MM'X$  ( $M, M'$  = transition metals,  $X$  = Si, Ge, Sn, etc.) have been identified as the new shape memory alloys. Apart from the shape memory effect, these alloys are particularly important for their various promising functional properties, including the large magnetocaloric effect, magnetoresistance, the exchange bias effect, etc. The magnetic structure of MEAs, both in martensite and austenite phases, are playing a pivotal role in the observation of interesting functional properties. Neutron diffraction studies reveal the detailed magnetic structure of both martensite and austenite phases. The diffusionless martensitic transition was found to show a significant influence on the magnetic structure of these materials.

## DOES SIZE MATTER IN MAGNETISM?

DR. SAURAV GIRI

### Brief abstract:

In the lecture, fundamentals of magnetism will be initially discussed, which will be followed by discussion of size effects in magnetism. Some potential applications of nanomagnetism in nature and technology will be next highlighted in the lecture.

## DECODING EXOTIC FRUSTRATED MAGNETISM USING EXTREME-CONDITION-MAGNETOMETRY

DR. SUMANTA CHATTOPADHYAY

### Brief abstract:

In this webinar, I plan to demonstrate how magnetometric study performed under extreme conditions of temperature and magnetic field could serve as a powerful tool in discovering highly non-trivial spin-states in frustrated magnets. To illustrate the topic, I will present an example of a new frustrated quantum magnet called BHAP-Ni<sub>3</sub> and will show how magnetometry performed in the milli-kelvin regime using very strong magnetic field unfolded the existence of an exotic spin-state of quantum origin.

## DISCOVERY OF WEYL FERMIONS IN BAND TOPOLOGY

DR. RAJIB BATABYAL

### Brief abstract:

The discoveries of topological phases of matter open up a new avenue of research where the role of mesoscopic effects becomes as dominant as that of topology. This leads to the investigation of predicted topological states, with a large number of protecting symmetries, edge state structures and other striking physical properties such as absence of backscattering and ultrahigh electron mobility, quantum oscillations, negative magnetoresistance originating from chiral anomalies, nonlocal transport, non-Abelian statistics, spin-momentum locking and associated superconductivity. The existence of the topological "Fermi-arc" surface states are the hallmark of realizing the Weyl Fermions in condensed matter physics in both the inversion and time reversal symmetry broken semimetals. In this lecture, the discovery of Weyl Fermions will be discussed and the interplay between surface and bulk states will be shown in terms of the two extremes: the protection and the manipulation of the topological states that are attributed to different penetration depths of the Fermi arcs into the bulk.