

# Surya Sen Mahavidyalaya

## Siliguri



ASSESSMENT PERIOD  
2018-2019 TO 2022-2023

**SUPPORTING ATTACHMENTS**

**CRITERION – 3**

**Key Indicator – 3.2 Innovation Ecosystem**

*3.2.2 Number of workshops/seminars/conferences including programs conducted on Research Methodology, Intellectual Property Rights (IPR) and entrepreneurship during the last five years.*

**Content:**

**International Webinar on Current Topics in Emerging Magnetic Materials**

# SURYA SEN MAHAVIDYALAYA

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

[NAAC ACCREDITED] [ISO 9001:2015]

Block B, Surya Sen Colony, Siliguri, WB – 734004.

(Affiliated to University of North Bengal)

Department of Physics



Date: 14.07.2021

## INTERNATIONAL WEBINAR

# Current topics in emerging magnetic materials

Organized by

Department of Physics and IQAC

Surya Sen Mahavidyalaya, Siliguri, WB

(A constituent college of University of North Bengal)

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

[NAAC ACCREDITED] [ISO 9001:2015]

**Date and time – July 14, 2021, 10:30 AM – 4:10 PM**

Online Platforms: Google meet and YouTube Live

### List of presentations:

#### 1. Does size matter in magnetism?

**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.

**Speaker:**

**Dr. Saurav Giri**

Professor and School Chair

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

**Time: 11 AM – 12 PM**

  
DR. P.K. MISHRA  
Principal  
Surya Sen Mahavidyalaya  
Siliguri - 734004



#### 2. Martensitic transition assisted modification of the magnetic structure in magnetic equiatomic alloys

**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.

**Speaker:**

**Dr. Souvik Chatterjee**

Scientist E,

UGC-DAE Consortium for Scientific Research, Kolkata Centre, Sector-III, LB-8, Saltlake, Kolkata:- 700106

**Time: 12 PM – 1 PM**

### 3. **Discovery of Weyl Fermions in Band Topology**

**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.

**Speaker:**

**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

**Time: 2 PM – 3 PM**



### 4. **Decoding exotic frustrated magnetism using extreme-condition-magnetometry**

**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 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 existence of an exotic spin-state of quantum origin.

**Speaker:**

**Dr. Sumanta Chattopadhyay**

Research Fellow,

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

**Time: 3 PM – 4 PM**



## **Schedule of the Programme:**

10:30 AM – 11:00 AM: Introduction by Convener, Dr. Arindam Karmakar

Welcome address by Principal, Dr. Pranab Kumar Mishra

DR. P.K. MISHRA  
Principal  
Surya Sen Mahavidyalaya  
Siliguri - 734004

Address by IQAC coordinator, Dr. Arnab Baul

Session Chair: Dr. Arindam Karmakar

11:00 AM – 11:50 AM: Presentation by Dr. Saurav Giri

11:50 AM – 12:00 PM: Questions and answers

12:00 PM – 12:50 PM: Presentation by Dr. Souvik Chatterjee

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

02:50 PM – 03:00 PM: Questions and answers

03:00 PM – 03:50 PM: Presentation by Dr. Sumanta Chattopadhyay

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, Surya Sen Mahavidyalaya and Formal closing of the programme.

## Organizing committee:

Chief Patron: Sj. Jayanta Moulik (President, Governing Body, Surya Sen Mahavidyalaya)

Patron: Dr. Pranab Kumar Mishra (Principal, Surya Sen Mahavidyalaya)

Coordinator IQAC: Dr. Arnab Baul

Convener: Dr. Arindam Karmakar (Assistant Professor and DiC, Dept. of Physics, Surya Sen Mahavidyalaya)

Members: Dr. Romyani Goswami (Assistant Professor, Dept. of Physics, Surya Sen Mahavidyalaya)

Mr. Arka Prava Mitra (SACT, Dept. of Physics, Surya Sen Mahavidyalaya)  
Dr. Soma Adhikari (SACT, Dept. of Physics, Surya Sen Mahavidyalaya)

Technical Support: Technical Team, Surya Sen Mahavidyalaya

## Registration and e-certificates:

Mandatory free registration was done through google form. A WhatsApp group was made with all the registered participants. Last date of registration was 13/07/2021 till 12 midnight. E-certificates were issued to the participants. Feedback forms were shared in both first and second halves. The program received good feedback.

## Brief summary of the event:

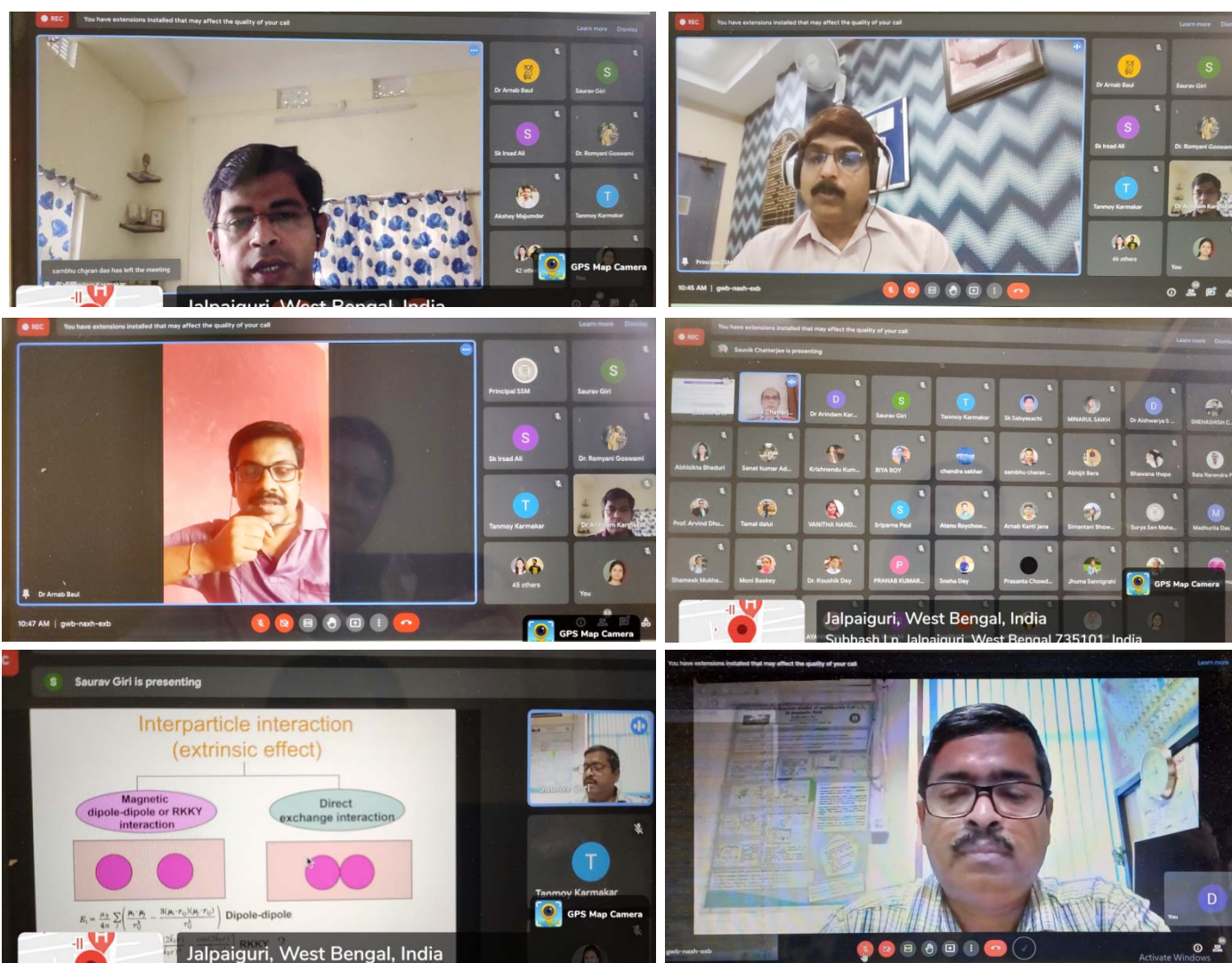
The program started in time with the introduction of the convener. The principal, Dr. Pranab Kumar Mishra then delivered the welcome address followed by address of the IQAC coordinator, Dr. Arnab Baul. Immediately after this, the first session was started and chaired by Dr. Arindam Karmakar. Two detailed presentations were delivered as per schedule with brief discussion sessions after each. The first presentation by Dr. Saurav Giri dealt with many fundamental understanding of magnetism in materials both in the bulk and the nano-scale followed by citations of several examples. The fundamental topics spurred a lot of interest in the audience. The next presentation dealt with the interesting shape memory properties of some alloys and their low temperature

DR. P.K. MISHRA  
Principal  
Surya Sen Mahavidyalaya  
Siliguri - 734004




(up to 2 K) characterizations using several advanced tools like squid magnetometer, PPMS and neutron diffraction. This unboxed many new ideas and information to the audience. This was followed by a one hour lunch break. During the second half, the presentations were delivered by experts from abroad, as detailed above. The third presentation was the most brilliant presentation of the day that described a school of blazing hot topics in physics such as topological states, ultrahigh electron mobility, quantum oscillations, negative magnetoresistance, superconductivity, Weyl fermions in 2D materials fabricated using a Scanning Tunneling Microscope. There was a detailed discussion following this which continued into the prospects of the research in the development of quantum computer. The fourth and the last presentation discussed several super-advanced experimental tools in modern day solid state physics that allow experiments in extremely low temperatures (milli-kelvin range) and extremely high magnetic fields (nearly 100 tesla and above). The lecture also demonstrated application of these tools using an interesting discovery of a spin-state of quantum origin in a new material. All the presentations were very successful in dissemination of several ideas and information about many interesting and contemporary phenomena in magnetism of materials and also in demonstrating several new advanced techniques of materials characterization used these days all over the world. The program was then concluded by a vote of thanks to the speakers. Not only the audience was excited about the program, the speakers were also very excited to deliver the presentations. About 57 participants were present from all over the country. Overall, the program was a grand success.

## Some pictures of the events:



  
**DR. P.K. MISHRA**  
 Principal  
 Surya Sen Mahavidyalaya  
 Siliguri - 734004

Martensitic transition assisted modification of the magnetic structure in magnetic equiatomic alloys



S. Chatterjee  
Scientist E  
Materials Science Division  
UGC-DAE Consortium for Scientific Research, Kolkata Centre

E-mail :- [souvik@alpha.iuc.res.in](mailto:souvik@alpha.iuc.res.in)

Souvik Chatterjee is presenting

UGC-DAE CSR announces  
Call for Collaborative Research Proposal on  
"Utilization of In-house and DAE Mega Science Facilities"

UGC-DAE Consortium for Scientific Research (UGC-DAE CSR), an inter University Centre established by the Government of India (GOI), provides specialized training and advanced instrumentation facilities to researchers and also makes some facilities of Department of Atomic Energy (DAE) accessible to them.

UGC-DAE CSR invites research proposals from faculty members of Universities/Colleges and Research Institutes under its Joint Collaborative Research Scheme (JCRR) for utilization of the Mega Science Facilities of the DAE (operational at IGCAT, Chennai Institute at BARC, and Cyclotron at VECI) and the advanced research facilities of our India - Mumbai, Kolkata, Chennai and the Padukasana-Nada. The broad objective of the Collaborative Research Scheme is to promote research in frontier areas of science & technology in Indian Universities/Colleges and Research Institutes by providing high end research facilities. JCRR projects are sanctioned normally with a student fellowship along with travel and local hospitality to local experimental facilities. For more details, please visit CSR user portal - <https://csruserportal.com/>.

KEY AREAS OF RESEARCH: Proposals from broad areas of research covering Physical, Chemical, Biological and Engineering Sciences are invited. Details of all the in-house experimental facilities and DAE Mega Science facilities can be found at <http://www.csr.in>.

WHO CAN SUBMIT? Permanent faculty members/Scientists from all UGC approved/AAC-accredited universities, affiliated colleges and other UGC recognized research institutions are eligible to submit proposals to UGC-DAE CSR. Researcher/Scientists from other countries are permitted to submit a joint proposal, if they wish. Previous knowledge may also consider involvement of an industry partner for value addition to the proposal.

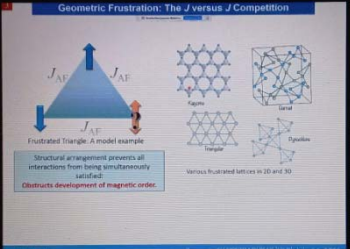
HOW TO SUBMIT? Complete proposal including a brief introduction/origin of the proposal, objectives, feasibility of the work, and fellowship should be submitted online through CSR user portal. A researcher is eligible to submit any one proposal during the call.

Visit our website for details:  
[About UGC-DAE CSR](#)  
[Why UGC-DAE CSR?](#)  
[Who are eligible?](#)  
[DAE Science user CSR](#)  
[UGC-DAE CSR facilities](#)  
[Format of the proposal](#)

GPS Map Camera  
Jalpaiguri, West Bengal, India

Soma Chatterjee is presenting

Geometric Frustration: The J versus J Competition



Frustrated Triangle: A model example  
Structural arrangement prevents all interactions from being simultaneously satisfied.  
Obstructs development of magnetic order.

Various frustrated lattices in 2D and 3D.

GPS Map Camera  
Jalpaiguri, West Bengal, India  
Subhash Lane, Pandapara Rd, Jalpaiguri, West Bengal 735101, India

You have extensions installed that may affect the quality of your call

Some Adhikari

GPS Map Camera

You have extensions installed that may affect the quality of your call

Soma Chatterjee is presenting

Some Adhikari

GPS Map Camera

You have extensions installed that may affect the quality of your call

Some Adhikari

GPS Map Camera

*Arindam Karmakar*

Dr. Arindam Karmakar  
Assistant Professor and D-i-C  
Dept. of Physics  
(Convener)  
Surya Sen Mahavidyalaya  
Siliguri, WB – 734004

  
DR. P.K. MISHRA  
Principal  
Surya Sen Mahavidyalaya  
Siliguri - 734004