



SREE NARAYANA COLLEGE

Sivagiri, Varkala, Kerala

(Affiliated to University of Kerala, Reaccredited by NAAC with B grade)



Invited talk on
“ Elements of
Statistical Mechanics ”

17th February 2021 at 6.30 pm

Organized by
Post Graduate Department of Physics
(DBT STAR Supported)

Resource person



Dr. V. Manikandan Nair
Rtd.Principal , Govt.College, Attingal

Google Meet link : <https://meet.google.com/hub-pxvx-uuw>

Organizing Committee

Dr.K.C.Preetha(Principal)
Sri. Sajesh Sasidharan(Coordinator)
Sri.Jyothish.B
Smt.Aiswaryamol.N.S
Smt.Parvathy .S.S

Dr. Aranya.S (HOD)
Smt.Veenas.C.L
Dr.Parvathi S Babu
Dr.Raji.R

WEBINAR REPORT

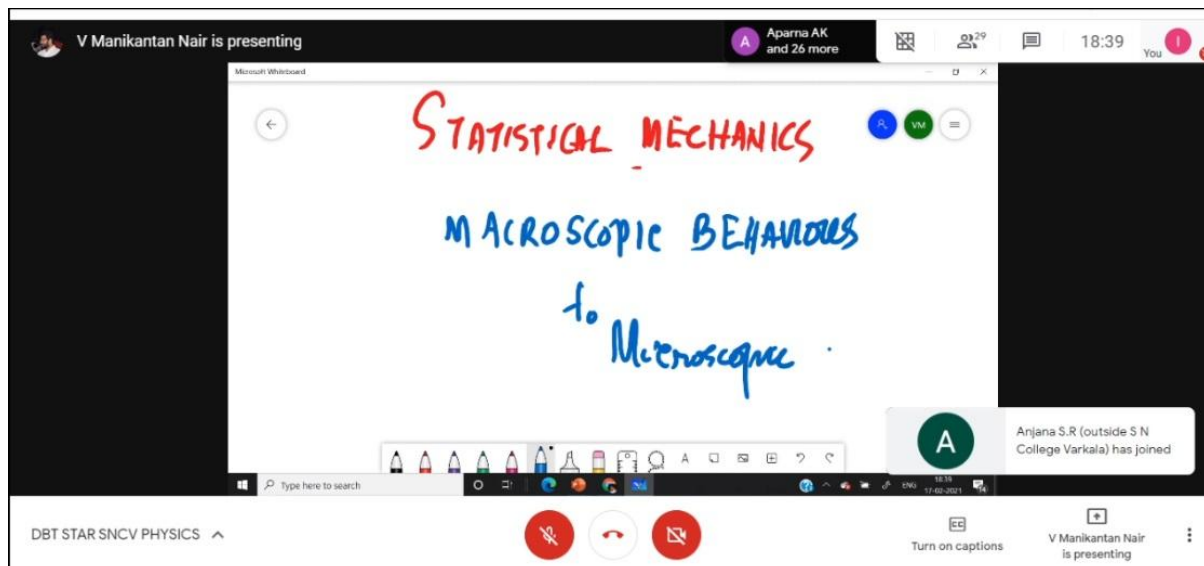
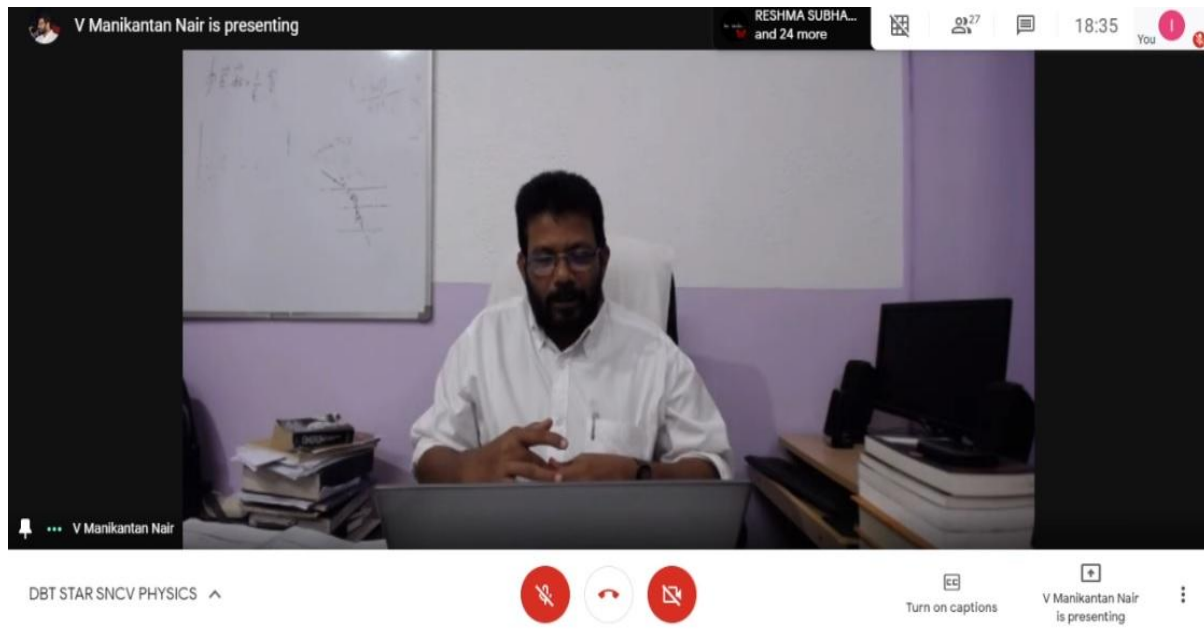
The Post Graduate Department of Physics, Sree Narayana College, Sivagiri, Varkala funded by DBT STAR Scheme conducted a webinar on " Elements of Statistical Mechanics" on 17.02.2021 at 6.30pm. The webinar was hosted in the presence of Dr. Manikandan Nair(Principal-Rtd, Govt. College, Attingal), Sri.Sajesh Sasidharan, Dr.Raji.R, Sri.Jyothish.B (Assistant Professors, Dept.of Physics) and third year B.Sc Physics students. Sri.Sajesh Sasidharan welcomed the resource person Dr.Manikandan Nair for his presentation. He handled the session with his natural teaching skills in the topic statistical mechanics. His speech include basics of statistical mechanics, micro and macro states, ensemble, phase space, derivations of different statistical approaches. The talk ended at 8.15pm and a doubt clearing session was allotted for participants to raise questions and to interact with guest. The programme ended with a formal vote of thanks from Ms.Reshma.R.Subhash.

List of Participants

Sl No	Name	Designation
1.	Sajesh Sasidharan	Assistant Professor
2.	Jyothish.B	Assistant Professor
3.	Dr. Raji.R	Assistant Professor
4.	Dr. Manikandan Nair	Resource Person

5.	Ardra R Kurup	3rd year BSc Physics student
6.	Athira M Nair	3rd year BSc Physics student
7.	Bhagya Suresh.S	3rd year BSc Physics student
8.	Jayanarayanan J.P	3rd year BSc Physics student
9.	Lakshmi.R.Ganesh	3rd year BSc Physics student
10.	Lakshmi.S	3rd year BSc Physics student
11.	Lekshmi.S	3rd year BSc Physics student
12.	Roopa G. Nath	3rd year BSc Physics student
13.	Shamla As	3rd year BSc Physics student
14.	Siva Priya.B	3rd year BSc Physics student
15.	Sreelekha B S	3rd year BSc Physics student
16.	Adarsh.S	3rd year BSc Physics student
17.	Akhiladavid	3rd year BSc Physics student
18.	Akshay B S	3rd year BSc Physics student
19.	Aparna. A	3rd year BSc Physics student
20.	Arisona Retnakumar	3rd year BSc Physics student
21.	Arsha. S. S	3rd year BSc Physics student
22.	Gokul A	3rd year BSc Physics student
23.	Gouri Sankar Manikantan	3rd year BSc Physics student
24.	Jaseentha . C	3rd year BSc Physics student
25.	Milan B S	3rd year BSc Physics student
26.	Nileeni Dutt	3rd year BSc Physics student
27.	Reshma. R . Subhash	3rd year BSc Physics student
28.	Shijin S	3rd year BSc Physics student
29.	Silpa. S	3rd year BSc Physics student
30.	Sivakami.C.S	3rd year BSc Physics student

31.	Sujesh.S	3rd year BSc Physics student
32.	Ragi G.Raj	3rd year BSc Physics student
33.	Sreehari Asok	3rd year BSc Physics student



V Manikantan Nair is presenting

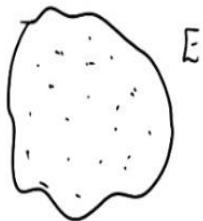
Nasrin m physics and 25 more

19:08

Microsoft Whiteboard

Micro states & Macro states

Accessible microstates



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V Manikantan Nair is presenting

Siva Priya Biju and 15 more

19:49

CHAPTER 9 Statistical Physics

- **underpins thermodynamics**, ideal gas (a classical physics model), ensembles of molecules, solids, liquids ... the universe
- 9.1 Justification for its need !
- 9.2 Classical distribution functions as examples of distributions of velocity and velocity² in ideal gas
- 9.3 Equipartition Theorem
- 9.4 Maxwell Speed Distribution
- 9.5 Classical and Quantum Statistics – when do we need to use them (can't get away with the classical distribution?)
- 9.6 Bose-Einstein statistics: Black body radiation, Liquid Helium, Bose-Einstein condensates
- 9.7 Fermi-Dirac Statistics

Ludwig Boltzmann, who spent much of his life studying statistical mechanics, died in 1906 by his own hand. Paul Ehrenfest, carrying on his work, died similarly in 1933. Now it is our turn to study statistical mechanics. Perhaps it will be wise to approach the subject cautiously.

- David L. Goldstein (States of Matter, Mineola, New York: Dover, 1985)

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V Manikantan N. and 13 more

20:00

Table 9.1 The Three Statistical Distribution Functions

	Maxwell-Boltzmann	Bose-Einstein	Fermi-Dirac
Applies to systems of	Identical, distinguishable particles	Identical, indistinguishable particles that do not obey exclusion principle	Identical, indistinguishable particles that obey exclusion principle
Category of particles	Classical	Bosons	Fermions
Properties of particles	Any spin, particles far enough apart so wave functions do not overlap	Spin 0, 1, 2, ...; wave functions are symmetric to interchange of particle labels	Spin $\frac{1}{2}, \frac{3}{2}, \dots$; wave functions are antisymmetric to interchange of particle labels
Examples	Molecules of a gas	Photons in a cavity; phonons in a solid; liquid helium at low temperatures	Free electrons in a metal; electrons in a star whose atoms have collapsed (white dwarf stars)
Distribution function (number of particles in each state of energy ϵ at the temperature T)	$f_{MB}(\epsilon) = A e^{-\epsilon/kT}$	$f_{BE}(\epsilon) = \frac{1}{e^{\epsilon/kT} - 1}$	$f_{FD}(\epsilon) = \frac{1}{e^{\epsilon/kT} + 1}$
Properties of distribution	No limit to number of particles per state	No limit to number of particles per state; more particles per state than f_{MB} at low energies; approaches f_{MB} at high energies	Never more than 1 particle per state; fewer particles per state than f_{MB} at low energies; approaches f_{MB} at high energies

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Meet - DBT STAR SNCV PHYSICS

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You are presenting

8:06 PM

You're presenting to everyone

Stop presenting

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You are presenting

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V Manikantan Nair is presenting

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People (14)

Chat

- Info SN College (You)
- Abhijith J
- Athul S Raja
- Dr Raji R
- Fathima Nahas
- Guimesh chand
- Jeena Najeeb
- JYOTHISH BABU