Debabrata Deb, PhD
Assistant Professor
School of Physics and Material Science

THAPAR INSTITUTE
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24th May, 2018

Advertisement for the post of JRF in DST-SERB sponsored research project

Applications are invited for the post of junior research fellow (JRF) to work in the following project sponsored by Science and Engineering Research Board (SERB).

Title: Substrate mediated phase transition in two-dimensional liquid crystal systems.

Position: JRF

Duration: Three Years

Fellowship: As per the DST-SERB norms JRF: Rs. 25000/- + HRA

Minimum Qualification: M.Sc. with minimum 55% marks or equivalent grade in a relevant subject and a valid NET/GATE score.

Last Date of Applications: ***July 24, 2018***

Date of Interview: ***July 26, 2018 at 11 AM*** in the office of Head, School of Physics & Materials Science (SPMS), Thapar Institute of Engineering and Technology (TIET), Patiala.

Candidates interested to appear in the interview should email their detailed biodata mentioning (a) the percentage/CGPA obtained at 10th, 10+2, graduate and post-graduate level, (b) the NET/GATE score, (c) the information on the dissertation/project work carried out (if any) by **July 24, 2018 (5 PM)** to **debabrata.deb@thapar.edu**.

No TA DA will be given for attending the interview.

Dr. Debabrata Deb
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School of Physics & Materials Science (SPMS)
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Project Title: Substrate mediated phase transition in two-dimensional liquid crystal systems

Funding Agency: SERB, Dept. of Science and Technology (DST), India

Project Summary: In this technological era electronic display are every where, from hand held mobile device to giant screen display at the airports and outdoor games. Now a days more than 80% of the display devices are using liquid-crystals (LC) as their building blocks. The presence of LC are diverse, ranging from their use in mechanical strength enhancement of plastics, snail slime, detergent, textile fibers, crude oil, mineral slurries, lipstick etc. The shape anisotropy of LCs is being used in soft material industry to change the character (functionalization) of a pure material by mixing the material with appropriately choose LCs. In this proposal we take the endeavor to investigate the static and dynamic properties of two dimensional (2D) LCs in the presence of an underlying substrate.

The theoretical frame work with in which the phase behavior of 2D systems are understood is known as KTNHY theory named after Kosterlitz, Thouless, Halperin, Nelson, and Young. The objective of our proposal is to verify some of the predictions made in the original work of Halperin, Nelson in 1979 such as the existence of a floating solid, condition for commensurate-incommensurate transformation, depinning of 2D LC etc. We would use molecular dynamics technique to simulate the LC at various temperature and substrate conditions. The basic academic understanding that would be obtained from this investigations would not only be useful for LC community but also for other relevant communities such as 2D colloids, 2D vortices in superconductors, ferromagnetic films etc.

Ideal Candidate: In this project, the JRF would be involved in running computer simulations that would implement the concepts of statistical mechanics to understand the properties of liquid crystalline materials. Apart from the basic requirements as per the guidelines of the funding agency, we are looking for a candidate who would ideally be

- highly motivated to work in a research problem that is challenging
- having a love for writing computer codes and manage computer simulation.
- having a fair experience in academic research (master's thesis)