

UNL Department of Physics and Astronomy &  
Nebraska Center for Materials and Nanoscience present:

## Investigating Cosmic String Theories with Liquid Crystal Experiments

PRESENTED BY

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Physics  
Bhubaneswar



**THURSDAY**  
**31 JANUARY**  
**4:00 PM**  
**IN JH 136**

Refreshments will be  
served in the JH 1st  
Floor Vending Area at  
3:30

### ABSTRACT

Spontaneous symmetry breaking plays crucial role in elementary particle physics, leading to the existence of Higgs boson to exotic topological objects like cosmic strings and magnetic monopoles in the universe. Analogs of such topological objects in condensed matter are flux tubes in superconductors, vortices in superfluids, and hedgehogs and strings in liquid crystals. Liquid crystals provide a very convenient system where such topological defects can be experimentally studied in a variety of physical conditions. We will discuss how the observations of string formation in a liquid crystal system can be used to test theories of cosmic string formation in the early universe. Main focus of these investigations is on various universal aspects of defect formation with which one can establish rigorous quantitative correspondence between these condensed matter experiments and elementary particle physics models of the early universe.

### Bio

Prof. Ajit Srivastava is a high energy physicist and cosmologist who is the former director of the Institute of Physics (India) and has been affiliated with the Institute for Theoretical Physics, University of California, Santa Barbara, and Theoretical Physics Institute, University of Minnesota. He has worked with condensed matter physicists regarding condensed matter analogs to cosmology.