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OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY
沖縄科学技術大学院大学

THEORETICAL SCIENCES VISITING PROGRAM

TSVP TALK

Topological Defects in Hard and Soft Condensed Matter

2024
TUE.

Dec. 10

16:00–17:00

HYBRID L4E01, ZOOM



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Topology and topological defects play an increasingly important role in condensed matter including in a variety of emerging topological quantum materials such as graphene, Dirac and Weyl semimetals, topological insulators, topological superconductors as well as nematic and smectic liquid crystals, among other hard and soft materials. Examples of such defects include domain walls, disclinations, dislocations, solitons, skyrmions, hopfions, etc. They determine the electronic, magnetic, optical, vibrational, mechanical and other properties of the materials. In certain cases, such defects can be utilized in novel computing paradigms. This talk will provide a review of many of these defects and the materials that harbor them. Finally, specific device and computing related applications will also be discussed.

Los Alamos National Lab

Avadh Saxena

Avadh Saxena is former Group Leader of the Condensed Matter and Complex Systems group (T-4) at Los Alamos National Lab, New Mexico, USA where he has been since 1990. He is also an affiliate of the Center for Nonlinear Studies at Los Alamos. His main research interests include phase transitions, optical, electronic, vibrational, transport and magnetic properties of functional materials, device physics, soft condensed matter, non-Hermitian quantum mechanics, geometry, topology and nonlinear phenomena & materials harboring topological defects such as solitons, polarons, excitons, breathers, skyrmions and hopfions. He recently completed a book on “Phase Transitions from a Materials Perspective” (Cambridge University Press, 2024). He is an Affiliate Professor at the Royal Institute of Technology (KTH), Stockholm, Sweden and holds adjunct professor positions at the University of Barcelona, Spain, University of Crete, Greece, Virginia Tech and the University of Arizona, Tucson. He is Scientific Advisor to National Institute for Materials Science (NIMS), Tsukuba, Japan. He is a Fellow of Los Alamos National Lab, a Fellow of the American Physical Society (APS), a Fellow of the Japan Society for the Promotion of Science (JSPS) and a member of the Sigma Xi Scientific Research Society, APS and American Ceramic Society (ACerS).

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