北京大学量子材料科学中心

International Center for Quantum Materials, PKU

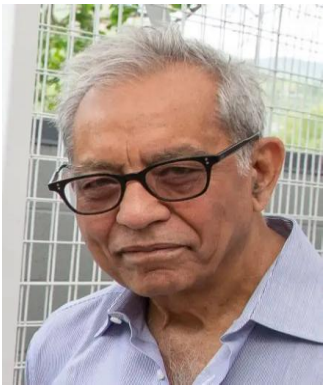
北京大学海外名家讲座

Peking University Overseas Distinguished Scholars Lectures

The Bose Metal: A Quantum-critical Phase

Chandra Varma

Emeritus, Bell Labs and University of California



Time: 10:00 am, Nov.20, 2026(Friday)

时间：2026年11月20日（周五）上午10:00

Venue: Room w301, Physics building, Peking University

地点：北京大学物理楼，西301思源报告厅

Abstract

A deep unsolved problem existing for over thirty years is, whether for bosons only superfluid and insulators exist in the Lim T → 0, or whether there is also an anomalous normal fluid phase. For fermions, the same problem is whether a metallic phase exists with flux quantization h/2e, between the insulating and superconducting phases, called therefore the Bose metal. Experimental results show such a phase at T << Tc with very high T-independent conductivity with singular frequency dependence, no superfluid stiffness, zero Hall effect but a finite singular Thermopower.

I derive the existence of such a phase through coupling a quantum-xy model with quenched disorder and find that the properties are given by quantum excitations called warps, which are a variety of instantons. Some predictions for future experiments are provided.

About the speaker

Chandra Varma is a theoretical condensed matter physicist. He worked for 35 years in the theoretical physics department at Bell Laboratories, including 4 years as department head and 20 years as a distinguished member of staff. He also spent 14 years as Chancellor's Distinguished Professor at the University of California, Riverside. Varma is currently Emeritus Distinguished Professor at Riverside and visiting Professor at Berkeley. He has made the leading contributions to several important fields of condensed matter physics that he has worked on.

He is a member of the American Physical Society, an American Association for the Advancement of Science Fellow, a Fellow of World Academy of Sciences, a Fellow of American Academy of Arts and Sciences, Lorentz Professor 2000, and Professeur visitant, College de France 1997. He was also a Miller Professor at Berkeley in 2010. Varma was awarded the Bardeen prize in 2012 for his prediction of anisotropic superconductivity and theory of its promotion by antiferro-magnetic fluctuations.

扫码报名

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