Malaviya National Institute of Technology Jaipur

Celebrating the Quantum Century

INTERNATIONAL YEAR OF QUANTUM SCIENCE AND TECHNOLOGY (IYQ 2025)

Distinguished Lecture by

Prof. Jainendra K. Jain

Evan Pugh University Professor,
The Pennsylvania State University, USA

Wolf Prize Laureate in Physics 2025

Renowned for the Composite Fermion Theory of the Fractional Quantum Hall Effect

14 July 2025; 03:00 PM

Neeti Sabhagar, Prabha Bhawan, MNIT Jaipur

Prof. Jain is a theoretical physicist in the field of quantum condensed matter physics, with interests in the area of strongly interacting electronic systems in low dimensions. He is best known for predicting a new class of particles that he named composite fermions, and for explaining the phenomenon of the fractional quantum Hall effect as the integral quantum Hall effect of composite fermions. Prof. Jain is a recipient of the Distinguished Alumnus Award of the Indian Institute of Technology, Kanpur, the Oliver E. Buckley Prize of the American Physical Society, and the Wolf Prize in Physics. He is a member of the U.S. National Academy of Sciences, the American Academy of Arts and Sciences, and a Foreign Fellow of the Indian National Science Academy. He has held Visiting Professorships at IISc, Bangalore, TIFR, Mumbai and IISER, Pune. He currently holds the titles of Evan Pugh University Professor, Erwin Mueller Professor of Physics, and Eberly Family Chair of Physics at the Pennsylvania State University.

A Strange New Universe: Where Bizarre Quantum Particles Rule

When electrons are confined to two dimensions and exposed to a strong magnetic field, they give rise to an astonishing new world, one that defies our everyday intuition. In this realm, electrons capture quanta of magnetic field to transform into exotic particles known as composite fermions. These particles form the foundation of an unexpected and remarkably rich quantum landscape. In this talk, I will share the motivations that led to the discovery of composite fermions, explain what they are, and explore the expansive phenomenology they produce, including additional bizarre particles that could pave the way to new technology. No advanced background required, just a willingness to be amazed by quantum physics.

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