KAAPI WITH KURIOSITY

Neutron Stars: Natural Laboratories for the Universe's Smallest and Largest Scales

Neutron stars are nature's ultimate physics laboratories — cosmic remnants where matter is crushed beyond atomic limits and gravity warps space-time itself. Inside them, the rules of quantum mechanics unfold on a stellar scale: particles are packed so tightly that electrons and protons fuse into neutrons, forming a vast quantum fluid. By studying these extreme objects, we can probe nuclear forces in ways not achieved in our terrestrial labs. Recent gravitational wave observations from LIGO-Virgo of colliding neutron stars and X-ray observations by NICER are revealing their masses, sizes, and internal structure. I will discuss how these discoveries are linking the physics of the very small to the structure of the cosmos, showing how quantum laws and gravity interact in nature's most extreme environments.

Sukanta Bose

Sukanta Bose is a professor of Physics and Astronomy at the Washington State University, Pullman. He was also a member of the IUCAA faculty for a decade since 2013. He and his research group worked with the LIGO Scientific and Virgo Collaborations to make the first direct observations in 2015 of gravitational waves from a remote collision of two black holes. For that discovery he shared the Breakthrough Prize in Fundamental Physics (2017) with members of those collaborations. He is a Fellow of the Indian Academy of Sciences and an elected member of the International Society of General Relativity and Gravitation (ISGRG) Committee. He was the Project Coordinator of LIGO-India at IUCAA from 2019 – 2022. LIGO-India is an Indo-US project that is building a LIGO detector in India to complement the two detectors in the US.

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Mini Auditorium, U R Rao Bhavana
Jawaharlal Nehru Planetarium, Bengaluru

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