

ICTP prize



The Abdus Salam
International Centre
for Theoretical Physics



2019 ICTP PRIZE CEREMONY

2 June 2021, 11:30

PROGRAMME



The Abdus Salam
International Centre
for Theoretical Physics



United Nations
Educational, Scientific and
Cultural Organization



IAEA
International Atomic Energy Agency

THE 2019 ICTP PRIZE

ICTP has awarded its 2019 ICTP Prize to
Basudeb Dasgupta, Tata Institute of Fundamental
Research, Mumbai, India,
and
Suvrat Raju, Tata Institute of Fundamental Research,
Bengaluru.

Basudeb Dasgupta was recognised for his innovative theoretical contributions to neutrino and dark-matter physics, especially to the understanding of collective neutrino oscillations.

Suvrat Raju was cited for his new insights into the holographic description of black-hole interiors, for clarifying the nature of subtle non-local effects in quantum gravity, and for contributions to the study of the AdS/CFT correspondence.

Each year, the ICTP Prize is given in honor of a scientist who has made outstanding contributions to the field in which the prize is given. The 2019 ICTP Prize is given in honour of Subrahmanyan Chandrasekhar. Born on 19 October 1910 in Lahore, Punjab, British India, Chandrasekhar is one of the most renowned and prolific Indian scientists. He worked on a great variety of subjects, making groundbreaking discoveries in different fields. He was awarded the 1983 Nobel Prize in Physics for “theoretical studies of the physical processes of importance to the structure and evolution of the stars”. He died on 21 August 1995.

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Welcome remarks, Atish Dabholkar, Director, ICTP

Introductory remarks, Ashoke Sen, Harish-Chandra Research
Institute, India

2019 ICTP Prize Lectures

Dying Stars, Dancing Neutrinos, and Us

Basudeb Dasgupta, Tata Institute of Fundamental Research, Mumbai, India

Heavy stars end their lives in a supernova explosion, where about 10^{57} neutrinos and antineutrinos are emitted over 10 seconds. These neutrinos perform an unusual and intricate dance -- repeatedly changing their flavor in a synchronized manner over nanoseconds -- as they leak out of the star. The rich and complex physics of this many-body quantum phenomenon affects the stellar explosion and the creation of vital chemical elements. In this talk, I will walk you through what we have learnt over the past two decades, what questions remain unanswered and how we, neutrino astronomers and astroparticle physicists, hope to unravel these mysteries.

The Principle of Holography of Information

Suvrat Raju, International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, Bengaluru

We will argue, using only broad physical principles, that any theory which combines quantum mechanics and gravity must have the property that information that is available on the bulk of a Cauchy slice is also available near the boundary of the slice. When applied to spacetimes with a negative cosmological constant, this approach sheds light on the origins of the AdS/CFT duality. It also indicates how holography should work for four-dimensional asymptotically flat spacetimes and has interesting implications for black holes.

ABOUT THE ICTP PRIZE SCULPTURE

The ICTP Prize sculpture consists of a plaque emerging out of stone, symbolizing the emergence of new, refined knowledge. The stone base is made of Aurisina marble, which has been quarried in the vicinity of Trieste for more than 2000 years. The special kind of stone and the waves represent Trieste's setting between the karstic hills and the sea.

