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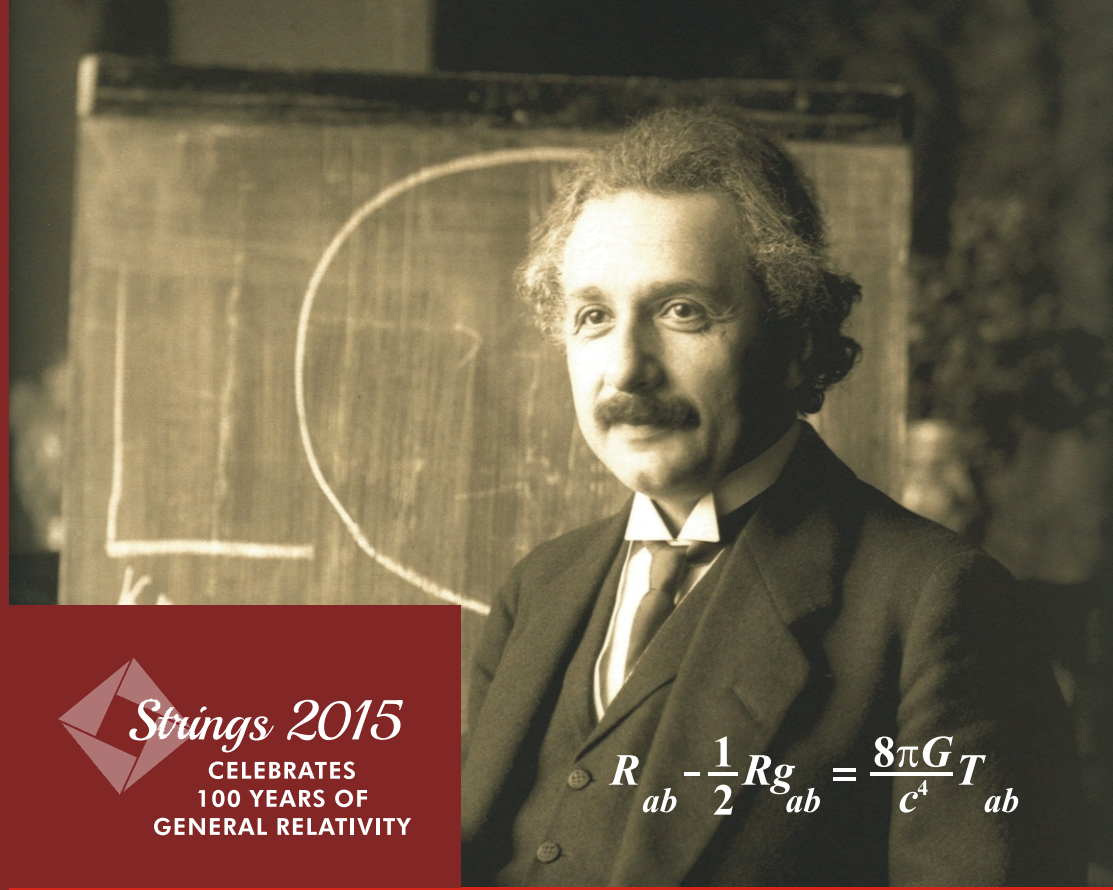


Strings 2015
CELEBRATES
100 YEARS OF
GENERAL RELATIVITY

PARTICLES, GRAVITY & STRINGS

JUNE 27, 2015
Christ University Auditorium, Bengaluru, India

FUNDAMENTAL INTERACTIONS: A SESSION WITH STUDENTS

11AM

Nima Arkani-Hamed and Ashoke Sen will engage in a two-hour long interactive session with school and college students. The session will start with a 20-minute long presentation by each of the speakers. In his presentation, Arkani-Hamed will talk about the Standard Model of particle physics and the prospects of new discoveries in the coming years. Sen will then describe our current understanding of String Theory. These talks will be followed by detailed interaction with students in the audience. The speakers will field questions and discuss ideas.

NIMA ARKANI-HAMED

CALCULATE AND OBSERVE: THEORY AND EXPERIMENT IN FUNDAMENTAL PHYSICS

Bio

Nima Arkani-Hamed is a theoretical physicist with broad interests ranging from particle physics and string theory to cosmology and collider physics. He received his PhD from Berkeley in 1997. He was a professor at Harvard from 2001-2008, before joining the faculty of the Institute for Advanced Study in 2008. His awards include the Gribov medal of the European Physical Society, the Sackler prize of Tel-Aviv University, the Phi Beta Kappa award for teaching excellence, and the Fundamental Physics Prize.

ASHOKE SEN

WHAT IS STRING THEORY?

Bio

Ashoke Sen is a professor of physics at the Harish-Chandra Research Institute in Allahabad and has previously held faculty positions at the Tata Institute of Fundamental Research, Mumbai. Sen completed his Ph.D. in physics from Stony Brook University in 1982. He has made several path breaking contributions to the study of string theory, gravity and quantum field theory. His work on the bound state of monopoles provided the first concrete evidence for strong-weak coupling duality that has influenced a course of research in the field. Another influential contribution is about the precise nature of the tachyonic instabilities in open string theories. He has derived the leading correction to the Hawking Bekenstein entropy formula for black hole entropy and has demonstrated that the degeneracy of extremal black holes in String Theory agrees in detail with this formula and its generalizations.

Sen was awarded the Dirac Medal in 2014, the Fundamental Physics Prize in 2012, the Infosys Prize in 2009 and the S.S. Bhatnagar Award in 1994. The Government of India has recognized his contributions with the Padma Bhushan in 2013 and the Padma Shri in 2001. Sen is a fellow of the Royal Society of London and of all the Indian Science Academies.

PUBLIC LECTURES

2:30 PM

NATHAN SEIBERG

THE FRONTIERS OF FUNDAMENTAL PHYSICS

Abstract

In recent decades physicists and astronomers have discovered two beautiful 'Standard Models,' one for the quantum world of extremely short distances and one for the Universe as a whole. Both models have had spectacular success, but there are strong arguments that there must be new physics beyond them. Experiments in the near future could point to this new physics. In particular, we may be on the verge of a profound conceptual revolution that will change our view of the world.

Bio

Seiberg received his Ph.D. in 1982 from the Weizmann Institute of Science, where he worked from 1985-91 as a Senior Scientist, an Associate Professor and a Professor. During the years 1989-97 he was a Professor at Rutgers University. After having visited the Institute for Advanced Study on several occasions as a Member and a Visitor from 1982–95, he joined the Faculty of the School of Natural Sciences in 1997. Seiberg received many awards and honors including the John D. and Catherine T. MacArthur Foundation Fellowship, the Oskar Klein Medal, the Dannie Heineman Prize for Mathematical Physics of the American Physical Society and the American Institute of Physics, and the Fundamental Physics Prize. Additionally, Seiberg is a member of both the American Academy of Arts and Sciences and the National Academy of Sciences of the USA.

Seiberg is a mathematical physicist, whose research has made major contributions to understanding string theory, quantum field theory, and particle physics. His exact solutions of theories have uncovered unexpected insights, including the fundamental role of electric-magnetic duality in quantum field theories, and they have led to many applications in physics and mathematics. He has also clarified how supersymmetry can be dynamically broken and tested, an effort now underway at the Large Hadron Collider.

ANDREW STROMINGER

THE EDGES OF THE UNIVERSE: BLACK HOLES, HORIZONS AND STRINGS

Abstract

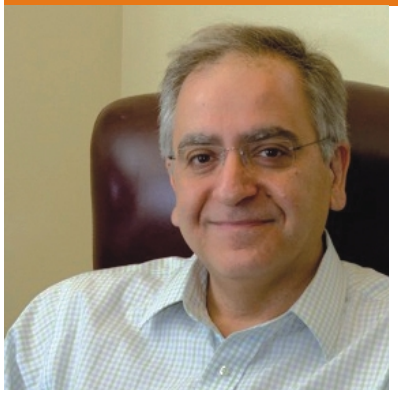
The visible universe has edges, known as event horizons, which surround a black hole or a region of space speeding away faster than light. Event horizons are governed by a strikingly simple set of quantum laws discovered four decades ago by Bekenstein and Hawking. These laws tell us that black holes are, at once, both the simplest and the most complex objects in the physical universe. This striking dichotomy underlies a deep and stubborn paradox, the resolution of which has become a focal point of modern physics. Unexpectedly, insight into this paradox has recently been gained from string theory. This lecture will give an elementary account of these developments for the general public along with a glimpse of what may lie ahead.

Bio

Andrew Strominger is a theoretical physicist with seminal and path-breaking contributions to quantum gravity and string theory. He is a co-discoverer of the Calabi-Yau compactification of string theory, which provides a unified framework for quantum gravity, and the theory of elementary particles. He provided, with coworkers, the first microscopic constituent model black holes and established the equality of the entropy formulas of Boltzmann and Hawking-Bekenstein. Both contributions are historic signposts in the quest to discover the fundamental laws of nature. Strominger has been awarded numerous prizes for this work including the Frontiers in Physics Breakthrough Prize, the Dirac Medal, and the Oskar Klein Medal. He was born in Cambridge, England and is currently Gwill E. York Professor of Physics, Director of the Center for the Fundamental Laws of Nature, and a Senior Fellow of the Society of Fellows at Harvard University. He is a member of the US National Academy of Sciences.

CUMRUN VAFA

PHYSICS AND GEOMETRY



Abstract

This talk reviews the deep connection between geometry and physics. The extra dimensions of string theory have provided a new opportunity for enhancing this interplay which will be reviewed using concrete examples.

Bio

Cumrun Vafa was born in Tehran, Iran in 1960. In 1977, he came to the United States to study at MIT, where he received a B.S. degree in physics and mathematics. He pursued his graduate education at Princeton University and obtained his Ph.D. in physics in 1985 under the direction of Edward Witten. While at Princeton he met his future wife, fellow student, Afarin Sadr. Later in 1985, he became a Junior Fellow at the Harvard Society of Fellows. He was appointed as a full professor in the Department of Physics at Harvard University in 1990 where he is currently the Donner Professor of Science.

Vafa has made seminal and path-breaking contributions to String theory and quantum gravity. In particular, his work with his collaborators on the exact calculation of black hole entropy in a constituent model in superstring theory is a major landmark in the subject. He is one of the pioneers of mirror symmetry and topological string theory which has also had an impact in pure mathematics. Cumrun Vafa is a member of the National Academy of Sciences of the USA and has received a number of awards including the Dirac Medal of ICTP in 2008, Frontiers in Physics Breakthrough Prize, and the AMS Leonard Eisenbud Prize for Math and Physics in 2008.