

Professor of Theoretical Physics
Dipartimento di Scienze Fisiche
Università di Napoli Federico II
Complesso Universitario di Monte Sant'Angelo,
Via Cintia, I-80126, Napoli, Italy

Venue : S. N. Bose National Centre for Basic Sciences, Salt Lake, Kolkata 700106, India

20-23 November, 2018.

Topics to be covered

"Noncommutative Geometry and Particle Physics"

Abstract: I will introduce the spectral approach to geometry, and its generalization to noncommutative geometry pioneered by Alain Connes. I will then apply these tools to the description of the standard model of fundamental interactions, the Higgs and beyond.

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S. N. Bose National Centre
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DATE	VENUE	TIME	SESSION	TOPIC
20-11-2018 (Tuesday)	Boson Hall	15:00 - 17:00	Lecture I	Noncommutative spaces, physical origins, mathematical foundations
21-11-2018 (Wednesday)	Boson Hall	15:00 - 17:00	Lecture II	Almost commutative geometry and the standard model
22-11-2018 (Thursday)	Boson Hall	11:00 - 13:00	Lecture III	Noncommutative geometry and "real" physics
23-11-2018 (Friday)	Boson Hall	15:00 - 17:00	Lecture IV	Next steps?

A useful reference is:

Fedele Lizzi: "Noncommutative Geometry and Particle Physics", Published in PoS CORFU2017 (2018) 133, e-Print: arXiv:1805.00411

About the Speaker



Professor Fedele Lizzi is one of the leading theoretical physicist in the area of High Energy Physics. Presently he is a professor of Theoretical Physics and Mathematical Models at the University of Napoli Federico II, Italy and Chairman of the Theoretical Physics Section.

After his under-graduation from Naples, he obtained his Masters and eventually his Ph.D. degree from Syracuse University (1980-85). He worked there on Skyrmions and Topological Solitons under the supervision of Professor A. P. Balachandran. After that he joined as a Post-Doctoral fellow at the Rutherford laboratory, Oxfordshire and subsequently at ICTP, Trieste, Italy.

He has been working on Noncommutative geometry, in its various flavours since its beginning. Concerning the Connes' spectral approach to the standard model, seen as a Noncommutative geometry, he and his collaborators identified the enlargement of the number of degrees of freedom, known as fermion doubling, which plays an important role in the identifications of the degrees of freedom, and its role for the calculation of the mass of the Higgs, and the Wick rotation. He has also connected the spectral action with scale anomalies. More recently, after the measurement of the mass of the Higgs particle, he and his collaborators have introduced and enlarged symmetry group which enables to reconcile the model with measured mass. This model points to a version of the Pati-Salam model.

Apart from Connes' approach, Prof. Lizzi also worked on other aspects of Noncommutative Geometry. He worked with various collaborators on strings and Noncommutative geometry, fuzzy spaces (introducing the fuzzy disc), Noncommutative field theory, mainly alternative to the usual Moyal product, cosmological consequences on Noncommutativity, Noncommutative lattices. Professor Lizzi has published more than hundred articles in International journals and also is a member of the Scientific Council of Ulisse. He has written the book 'Noncommutative Spaces: Symmetries in Noncommutative Geometry and Field Theory' in collaboration with P. Aschieri, M. Dimitrijevic, P. Kulish, J. Wess.

