PennState Physics Colloquium

Quantum Black Holes in Holography

Leopoldo Pando Zayas [1]

[1]University of Michigan

Speaker Biographic Summary

Leopoldo Pando Zayas is a professor of physics at the University of Michigan. He grew up in Cuba where he was a silver medal winner at the IPHO 1989. Leopoldo then studied at Moscow State University in Russia and has spent time at the Institute for Advanced Study, Princeton, Kavli Institute for Theoretical Physics, Santa Barbara and International Center for Theoretical Physics, Italy. He is primarily interested in a part of string theory known as the gauge/gravity correspondence that in recent years has lead to interesting connections with the physics of quantum gravity, fluids and certain superconductors. [1]

Research Interests

Leopoldo's research is motivated by better understanding the connections between gravity and gauge fields. Currently the main directions he is following involve: gravitational collapse in AdS, Wilson loops, and disorder in AdS/CFT. Leopoldo has other ongoing interests which involve the structure of certain supergravity solutions, proving and investigating dualities among string and field theories and localization of supersymmetric field theories as well as the role of classical and quantum chaos in AdS/CFT. [1]
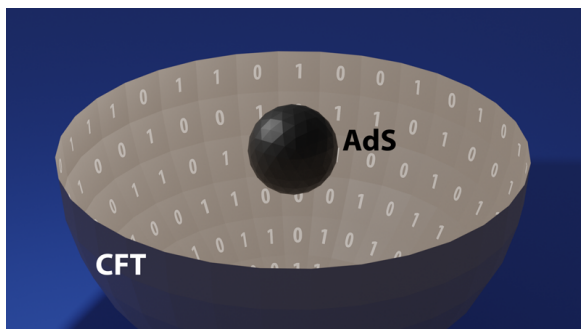

Above: AdS / CFT visual of black hole entropy. [2]

Talk Abstract

The anti-de Sitter/Conformal Field Theory (AdS/CFT) correspondence states that for a certain quantum system with gravity there is an equivalent field theory system without gravity. I will review some recent developments within the AdS/CFT correspondence where the Bekenstein-Hawking entropy of certain black holes has been given a microscopic, statistical mechanical foundation in terms of partition functions of the dual field theories. At the quantum level, the entropy of black holes is not exactly equal to one quarter of the area of the event horizon; it receives tiny quantum corrections proportional to the logarithm of the area. I will describe how these logarithmic corrections to the black hole entropy can be computed and how to match them successfully to a microscopic description based on the AdS/CFT correspondence.

Brief Background

Bekenstein-Hawking Entropy summary [3]
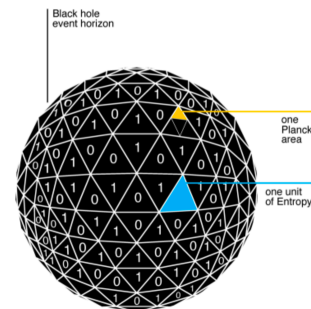
Ads/CFT summary. [2]

References

[1] "Leopoldo Pando Zayas," http://www-personal.umich.edu/~lpandoz/.
[2] L. A. P. Zayas, Physics **13** (2020).
[3] M. Baggioli, *Gravity, Holography and Applications*, Ph.D. thesis.

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