Black Holes, Neutron Stars, and Gravitational Waves @ Black Sea



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How Gravitational Wave Data From binary Black Hole mergers constrains black hole entropy

Gravitational wave data from BBH coalescence have recebtly been analyzed to validate Hawking's Area Theorem. We discuss how this validation constrains theoretical calculations of black hole entropy, including corrections to quantal or classical modifications of classical general relativity. We show how observational data discriminates between quantum gravity corrections to the Bekenstein-Hawking area formula, by unequivocally ascertaining the algebraic sign of these corrections. The origin and implications of these algebraic signs will be discussed for two approaches to black hole entropy corrections, namely Loop Quantum gravity and Euclidean Quantum Gravity. We shall also discuss a perturbative approach to classical modifications of general relativity, and discuss what that implies for the Wald formula for black hole entropy. The talk is based on the ArXiv'd papers 2305.09391v3 (published in PLB 2024) and 2408.13820v3 (published in PRD 2025).

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