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ABSTRACT

Key words : String Theory, Black Hole Entropy ,AdS-CFT ,Sub-leading corrections

Research Findings: . In our study we first have summarized our study of higher order corrections to the entropy formula and made comparative assessments with other formalism's including semi-classical methods with particular emphasis on convergences and divergences of entropy beyond the effective theory description particularly sub-leading corrections.

Sub-leading corrections to entropy Formula (convergences and divergences): There have been attempts to find the effective theory of horizon micro states that can describe the degrees of freedom at the horizon without reference to underlying theory of quantum gravity. This suggestion is in particularly plausible because of the universal appearance of con-formal symmetry in the neighborhood of horizon, which indicates dynamics' of horizon will be governed by 2 dimensional conformal field theory .Work of Strominger , Carlip and others in using Cardy formula to calculate horizon entropy is strong evidence in favor of this idea .Sub-leading corrections to area law are riddled with issues which have convergent and divergent aspects .Depending on theory scheme model or even method sub-leading terms turn out to have trivial and non-trivial aspects with generic character of first term being same whether strings loops or semi-classical methods with exception that sometimes the per-factor of logarithmic term comes out to be model dependent parameter .The startling feature of these formalism s is that con-formal symmetry can be enough to determine the entropy of horizon without knowing the underlying QFT lending support to the notion that effective theory of quantum gravity is 2d CFT. Here we would like to say that our studies suggest sub-leading terms should give us information

beyond effective degrees of freedom and give information of any theory of quantum gravity, which should give us veracity of that theory from first principles .To add to the above discussion we would like to say that the study of Black hole entropy has some generic features and some divergent aspects and it turns out that the leading order log correction is verified from the different theories of quantum gravity with a general consensus which is only missing with regard to the numerical per-factor of the calculations in various formalism's. Our understanding of the issue is that sub leading corrections should give us information beyond the leading order corrections which is observed in different formalisms. It should also give us veracity of the formalism whether strings loops or any other from the first principles and test the viability of a particular theory. In case of strings and loops the use of conformal field theory methods is basically a precursor to existence of effective field theory description supposed to be a two dimensional CFT . Our claim is that that beyond leading order corrections should give us information about the underlying quantum theory of gravity or Hidden gravitational degrees of freedom which otherwise seem to be disguised and not discernible from effective theory description.