APCTP SEMINAR

Bulk Geometry and Target Space Entanglement

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January 5th (Wed.) 16:00 (KST)
Online via ZOOM

Motivated by the Bekenstein-Hawking entropy and the area law behaviour of entanglement entropy, we propose that in a UV finite theory of quantum gravity with a smooth spacetime, the total entropy for a pure state in a co-dimension one spatial region, to leading order, is given by S=A/4G. In the context of Dp-brane holography (p<3) we show that for specially chosen regions bulk entanglement can be mapped to 'target space' entanglement in the D-brane Yang Mills theory. We provide a gauge-invariant characterization of operator sub-algebras corresponding to such entanglement by finding a projection operator which imposes the constraint characterizing the target space region of interest. Our conjecture leads to a precise proposal for target space entanglement at strong coupling and large N, in particular that it would scale like O(N^2). Recent numerical advances in the D0 brane system hold out the hope that this proposal can be tested in a precise way. Based on [2004.00613] and [2011.13857] with Sumit Das, Sinong Liu, Gautam Mandal & Sandip Trivedi.

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