

## 博士論文公聴会の公示（物理学専攻）

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論文題目： Emergence of Bulk Geometries from Conformal Field Theory（共形場理論に基づく時空創発の研究）

日時： 2018年2月7日（木） 16:20 - 17:50

場所： 理学研究科 H棟7階セミナー室（H701号室）

主査： 橋本幸士

副査： 飯塚則裕、大野木哲也、山口哲、酒井英明、

論文要旨：

We argue that a possible generalization of the entanglement entropy and its implication to the holography, especially AdS/CFT correspondence. The AdS/CFT correspondence is a way to define the quantum gravity in  $d+1$ -dimensional asymptotically anti-de Sitter (AdS) spacetime by using the conformal field theory (CFT) in  $d$ -dimension. In this context, it is still unclear how we can realize the  $d+1$ -dimensional full bulk geometries from the  $d$ -dimensional quantum field theories. The main object of this presentation is the minimal surface not necessarily anchored on the boundary, which has not been derived from the field theory analysis. First, we review how we can obtain minimal surfaces anchored on the boundary from the entanglement entropy. Then, we introduce a generalization of the entanglement entropy for mixed states and discuss its basic properties. Finally, we argue that we can extract the aforementioned minimal surfaces ending on the bulk from the generalized version of the entanglement entropy. Our explicit derivations include the geometries in three-dimensional AdS and BTZ black holes.