



# TOHOKU FORUM for CREATIVITY

Tohoku Forum for Creativity Thematic Program 2015

Fundamental Problems in Quantum Physics: Strings, Black Holes and Quantum Information

**International Workshop on Strings, Black Holes and Quantum Information**

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## Ab Initio Holography

Sung-Sik Lee  
(Perimeter)

Schedule:

Thursday, September 10, 9:30-10:30

Place:

TOKYO ELECTRON House of Creativity 3F, Lecture Theater  
Katahira Campus, Tohoku University

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Abstract:

Quantum renormalization group (RG) allows one to identify holographic duals for general quantum field theories. In this approach, RG flow is projected onto a subspace of 'single-trace' operators while the coupling constants for the single-trace operators are promoted to quantum variables. The partition function is given by the sum over all possible RG paths, and the weight for each path is determined by a dynamical action which includes gravity in one higher dimensional spacetime. An application of quantum RG to a lattice model will be presented, where different phases of matter exhibit varying degrees of locality in the bulk.