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Title	Investigation of Gauge-Gravity duality via 2D $N=(8,8)$ Super-Yang-Mills lattice simulations [an abstract of dissertation and a summary of dissertation review]
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Degree Grantor	北海道大学
Degree Name	博士(理学)
Dissertation Number	甲第11989号
Issue Date	2015-09-25
Doc URL	https://hdl.handle.net/2115/60071
Rights(URL)	https://creativecommons.org/licenses/by-nc-sa/2.1/jp/
Type	doctoral thesis
File Information	Eric_Giguere_abstract.pdf, 論文内容の要旨



学 位 論 文 内 容 の 要 旨

博士の専攻分野の名称 博士 (理 学) 氏 名 Eric Giguère

学 位 論 文 題 名

Investigation of Gauge-Gravity duality via

2D $\mathcal{N}=(8,8)$ Super-Yang-Mills lattice simulations

(2D $\mathcal{N}=(8,8)$ Super-Yang-Mills 理論の格子シミュレーションによる

ゲージ重力双対性の研究)

We study the gauge-gravity duality between supersymmetric $\mathcal{N}=(8,8)$ Yang-Mills theory in two dimensions and the supergravity solution of D1-brane in IIB string theory.

Through lattice simulations, we estimate physical quantities of the gauge theory and compare then to the dual quantity from black string thermodynamics.

In this study, we use Sugino's formulation for $\mathcal{N}=(8,8)$ super Yang-Mills in two dimensions.

It is the first simulations performed using this formulation so we first test its validity.

We confirm that the lattice artifacts of the model disappear in the continuous limit, then we observe restoration of the full supersymmetry using the supersymmetric Ward-Takahashi identity.

Lastly we compare the thermodynamic quantity E-PV obtained from the lattice simulations with the calculation done in the gravity side.

We find a good accordance at low temperature where the duality is expected to hold.