量子物理学・ナノサイエンス第 390 回セミナー

Holographic Global Vortices with Novel Boundary Conditions

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概　要

The AdS/CFT correspondence offers a powerful tool for studying strongly coupled systems. This work explores a novel approach to breaking a global $U(1)$ symmetry within the bulk region of two asymptotically AdS spacetimes: AdS plus hard wall and AdS Blackbrane. Our analysis employs a (3+1)-dimensional bulk $U(1)$ symmetry-breaking phase vacuum, incorporating a global $U(1)$ φ^4 field theory without a gauge field, which is distinct from previous models. We demonstrate that the symmetry-breaking vacuum necessitates a mass squared proportional to the quartic coupling. Furthermore, we investigate numerical solutions for topologically stable vortex strings extending into the bulk. Our findings suggest that the complete UV expansion corresponds to a point-like excitation on the boundary Holographic Global Vortices with Novel Boundary Conditions.

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