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Casimir energy for the domain-wall fermion

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We investigate Casimir energy for free fermions on the lattice.
The Casimir energy of fermion fields can be defined with the lattice regularization.
The continuum extrapolation of our results reproduces the Casimir energy known in continuum theory.
We also show the lattice effect for the Casimir energy.
The lattice effect is important as an artifact that should be well-understood in order to perform reliable lattice simulations with a small volume in particle physics.
On the other hand, the lattice effects can appear in materials such as topological insulators in condensed matter physics, and it can be detected in experiments.
We discuss a typical behavior near the phase-transition of the domain-wall fermion.

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