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## Chern-Simons invariants from ensemble averages

I will discuss ensemble averages of two-dimensional conformal field theories associated with an arbitrary indefinite lattice with integral quadratic form Q. I will provide evidence that the holographic dual after the ensemble average is the three-dimensional Abelian Chern-Simons theory with kinetic term determined by Q. The resulting partition function can be written as a modular form, expressed as a sum over the partition functions of Chern-Simons theories on lens spaces. For odd lattices, the dual bulk theory is a spin Chern-Simons theory, and I identify several novel phenomena in this case. I will also discuss the holographic duality prior to averaging in terms of Maxwell-Chern-Simons theories.

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