

## Gauge Theory of the Generalized Symmetry on the Torus Membrane

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Abstract: The  $SDIFF(T^2)_{local}$ -generalized Kac-Moody  $\hat{G}(T^2)$  symmetry is an infinite-dimensional group on the torus membrane, whose Lie algebra is the semi-direct sum of the  $SDIFF(T^2)_{local}$  algebra and the generalized Kac-Moody algebra  $\hat{g}(T^2)$ . In this paper, we construct the linearly realized gauge theory of the  $SDIFF(T^2)_{local}$ -generalized Kac-Moody  $\hat{G}(T^2)$  symmetry.

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