Generalized Symmetries

Qingjie Yuan

Department of Physics and Astronomy, Uppsala University,
Box 516, 75120 Uppsala, Sweden

E-mail: qingjie.yuan.9461@uu.student.se

Contents

1 Introduction **1**

2 Higher-form symmetry **1**
2.1 Symmetries as topological operators 1
2.2 Examples 1
2.2.1 Maxwell theory 1
2.2.2 SU(N) gauge theory 1

3 Spontaneous symmetry breaking **1**
3.1 Normal symmetry 1
3.2 Higher-form symmetry 1

Contents

1 Introduction

[1]

2 Higher-form symmetry

2.1 Symmetries as topological operators

In classical field theory, a symmetry is a transformation of the fields that preserves the action. At quantum level, in the absence of anomalies, it is a transformation under which the correlation functions are invariant.

Considering the infinitisimal global transformation: $\phi \to \phi' = \phi + \epsilon_a \delta_a \phi$, $\delta S = S[\phi'] - S[\phi] = 0$

2.2 Examples

2.2.1 Maxwell theory

2.2.2 SU(N) gauge theory

3 Spontaneous symmetry breaking

3.1 Normal symmetry

3.2 Higher-form symmetry

References

[1] D. Gaiotto, A. Kapustin, N. Seiberg and B. Willett, *Generalized Global Symmetries*, *JHEP* **02** (2015) 172 [1412.5148].