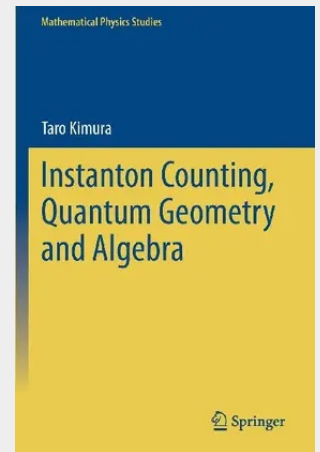


Instanton Counting, Quantum Geometry and Algebra

This book pedagogically describes recent developments in gauge theory, in particular four-dimensional $N = 2$ supersymmetric gauge theory, in relation to various fields in mathematics, including algebraic geometry, geometric representation theory, vertex operator algebras. The key concept is the instanton, which is a solution to the anti-self-dual Yang–Mills equation in four dimensions.

In the first part of the book, starting with the systematic description of the instanton, how to integrate out the instanton moduli space is explained together with the equivariant localization formula. It is then illustrated that this formalism is generalized to various situations, including quiver and fractional quiver gauge theory, supergroup gauge theory. The second part of the book is devoted to the algebraic geometric description of supersymmetric gauge theory, known as the Seiberg–Witten theory, together with string/M-theory point of view. Based on its relation to integrable systems, how to quantize such a geometric structure via the $\mathcal{O}$ -deformation of gauge theory is addressed. The third part of the book focuses on the quantum algebraic structure of supersymmetric gauge theory. After introducing the free field realization of gauge theory, the underlying infinite dimensional algebraic structure is discussed with emphasis on the connection with representation theory of quiver, which leads to the notion of quiver W -algebra. It is then clarified that such a gauge theory construction of the algebra naturally gives rise to further affinization and elliptic deformation of W -algebra.

This book pedagogically describes recent developments in gauge theory, in particular four-dimensional $N = 2$ supersymmetric gauge theory, in relation to various fields in mathematics, including algebraic geometry, geometric representation theory, vertex operator algebras. The key concept is the instanton, which is a solution to the anti-self-dual Yang–Mills equation in four dimensions. In the first part of the book, starting with the systematic description of the instanton, how to integrate out the instanton moduli space is explained together with the equivariant localization formula. It is then illustrated that this formalism is generalized to various situations, including quiver and fractional quiver gauge theory, supergroup gauge theory. The second part of the book is devoted to the algebraic geometric description of supersymmetric gauge theory, known as the Seiberg–Witten theory, together with string/M-theory point of view. Based on its relation to integrable systems, how to quantize such a geometric structure via the $\mathcal{O}$ -deformation of gauge theory is addressed. The third part of the book focuses on the quantum algebraic structure of supersymmetric gauge theory. After introducing the free field realization of gauge theory, the underlying infinite dimensional algebraic structure is discussed with emphasis on the connection with representation theory of quiver, which leads to the notion of quiver W -algebra. It is then clarified that such a gauge theory construction of the algebra naturally gives rise to further affinization and elliptic deformation of W -algebra.



149,79 €

139,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783030761929

Medium: Buch

ISBN: 978-3-030-76192-9

Verlag: Springer

Erscheinungstermin: 07.07.2022

Sprache(n): Englisch

Auflage: 1. Auflage 2021

Serie: Mathematical Physics Studies

Produktform: Kartoniert

Gewicht: 476 g

Seiten: 285

Format (B x H): 155 x 235 mm

