In the community of high-energy theoretical physics, last decade witnesses vast amounts of research papers on the computation of scattering amplitudes, leading us to remarkably simple forms of the amplitudes that we have never expected to obtain in the conventional Feynman-diagram approach. At the earlier stage these developments are unarguably stimulated by Witten's epoch-making paper [1] in which he shows a correspondence between four-dimensional $\mathcal{N} = 4$ super Yang-Mills theory and a certain type of topological string theory, namely the so-called topological B model whose target space is the supertwistor space $\mathbf{CP}^{3|4}$.

The above correspondence can be understood as a generalized picture of the previous observation, made by Nair in 1988 [2], that the maximally helicity violating (MHV) amplitudes of gluons (also called the Parke-Taylor amplitudes [3]) can be interpreted as correlation functions of a Wess-Zumino-Witten (WZW) model whose target space is $\mathbf{CP}^{3|4}$. What Witten shows in 2003 is that Nair's observation is also valid for non-MHV amplitudes in general by introducing the notion of algebraic curves in twistor space, suggesting that this picture would give rise to a thoroughly new calculatory method for the derivation of scattering amplitudes in gauge theories.

Indeed, within a year, two important calculatory methods were invented in this regard; one is the Cachazo-Svrcek-Witten (CSW) rules [4], which is also known as the MHV-vertex expansion rules, and the other is the Britto-Cachazo-Feng-Witten (BCFW) recursion relations [5, 6]. The former provides a prescription to construct tree-level amplitudes of arbitrary helicity configuration in terms of the MHV subamplitudes or vertices. The latter, on the other hand, gives a recursive description of the general tree amplitudes by use of complex shifts of external momenta for on-shell amplitudes.

These methods are compatible to each other and become a guiding force to the recent research in scattering amplitudes. Since the subject is new and does not necessarily require deep acquaintance with topological string theories, many young high-energy theorists have participated in the research. Elvang and Huang, the authors of the book under review, are among such scholars. This book grew out of necessity to introduce this relatively new subject to younger generation. An early version of the material can also be found in [7].

As the purpose of the book tells, it is written in a pedagogical fashion. The book consists of three parts. The first part starts with the review of the spinor-helicity formalism, an indispensable element of the subject, and presents detailed introduction to the BCFW recursion relations and the CSW

rules at tree level. Recently developed ideas such as dual conformal symmetry, momentum twistor space, etc., are also described in this part.

The second part deals with loop amplitudes. The authors first present the standard unitary-cut method (which is partly based on open string theories) and its recent progress in loop calculations of $\mathcal{N} = 4$ super Yang-Mills theory. Extensive discussion on application of the BCFW recursion relations to loop amplitudes (by use of the momentum twistor variables) then follows. Application of the CSW rules to loop amplitudes is also known in the literature but this particular topic is not included in the book.

Lastly, in the third part, current topics on scattering amplitudes are introduced. These include mathematical aspects of the amplitudes, such as Yangian invariance, Grassmannian formulation, and relation to the volume of a polytope. Amplitudes of dimensions higher or lower than four are also reviewed, with particular emphasis on relations to recently developed three-dimensional superconformal theories, *e.g.*, the so-called BLG and ABJM theories. Applications of the new methods to supergravity amplitudes are of great interests as well. Recent study indicates that we can interpret the gravity amplitudes as a "square" of the gauge-theory amplitudes at tree and loop levels. This interesting topic is covered in the last two sections of the book.

In summary, this book is very useful to overview recent rapid progress in the subject of scattering amplitudes. It fills a gap between standard textbook materials and current research topics of the quantum field theory. So it is particularly useful for graduate students and young researchers. There is a similar book written by Henn and Plefka [8], which is also recommendable for interested readers.

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