

Title: New Exciting Approaches to Scattering Amplitudes

Abstract:

The scattering cross-section is the key observable in particle physics experiments, such as the Large Hadron Collider at CERN. In quantum field theory, the cross-section is expressed in terms of the scattering amplitude, which traditionally is calculated as a sum of Feynman diagrams. When many particles are involved in a process -- as for example in multi-gluon scattering -- the Feynman diagram approach becomes very difficult, even at leading order (tree-level). In recent years, it has been realized that amplitudes possess a very interesting mathematical structure that can be exploited to find more efficient calculational methods. Surprisingly, it also turns out that some amplitudes have interpretations as volumes of certain abstract geometric objects. Not assuming prior knowledge of quantum field theory or Feynman rules, I will review the background and recent progress in this exciting field of research.

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