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The vernacular of the S-matrix

Monday 13 April 2015 16:30 (45 minutes)

The past several years have been witness to an ongoing revolution in our understanding of (perturbative) quantum field theory. In particular, a concrete proposal now exists for how to reformulate any theory recursively—without any reference to virtual particles, gauge redundancies, or any of the other unphysical baggage that so complicates computations in the traditional formalism. In addition to greatly simplifying computations, the recursive reformulation provides an important connection between field theory and the geometry (and combinatorics) of certain subspaces of the Grassmannian—a connection that has proven extremely fruitful for both physics and mathematics in recent years. Because both sides of this connection are greatly simplified (and best understood) in the case of planar, maximally supersymmetric Yang-Mills, this will be the primary example discussed. I will provide a broad overview to these ideas, starting from basic principles of quantum mechanics.

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