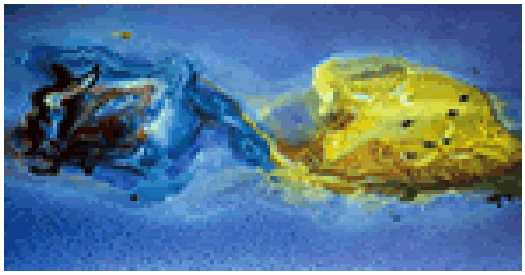

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Making Sense of Divergent Series: Resummation of Logarithms in the Nonrelativistic Expansions of Light-Cone Amplitudes

Sunday, 5 August 2018 15:20 (20 minutes)

Logarithms of the hard-scattering scale that appear in light-cone amplitudes can be resummed by making use of the Efremov-Radyushkin-Brodsky-Lepage (ERBL) evolution equation for the light-cone distribution amplitude (LCDA). The standard method for carrying out the evolution is to decompose the LCDA in a series of eigenfunctions of the lowest-order evolution kernel (Gegenbauer polynomials). When the LCDA is expressed as a nonrelativistic expansion, as in applications to heavy quarkonia, the eigenfunction series can become divergent because the unevolved LCDA contains generalized functions, such as the Dirac delta-function and its derivatives. We show that the divergent eigenfunction series can be regulated in a way that is consistent with the definition of the generalized functions by making use of Abel summation and that the regularization can be made computationally efficient through the use of Pade approximants. We present results from the application of our method to the calculation of the rates for Z-boson decays to a vector quarkonium plus a photon.

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