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Problems in Theoretical Physics

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Theoretical physics is rife with severe problems that have contaminated the research in high energy physics ever since the birth of this branch. Among several mathematical, technical, philosophical, and conceptual problems, prominent complications at the very nature of the field theories affect the theoretical progress in this area the most: the asymptotic nature of the perturbative expansions, proliferation and infeasibility of the brute force computations, lack of rigor in the common s-matrix construction, and even the very absence of an axiomatic definition of field theories themselves are all tantamount to the severity of this crisis. In this talk, I will review these conundrums, discuss their current status, and talk about several approaches that evade some of these problems, such as the positive geometry and the modern non-perturbative bootstrap.

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