Institut Henri Poincaré

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String Theory in Greater Paris

Rencontres Théoriciennes

“Supergravité, théorie des cordes et théorie M”

Jeudi 6 Mai 2021, 10:00

Simeon Hellerman

Tokyo University, IPMU

How Different Is More ? : Precision correlators at large R-charge

Building up macroscopic physics from microscopic constituents is an idea as old as theoretical physics itself, and has been a perennial theme in quantum theory beginning with Bohr’s correspondence principle and onward through the modern renormalization group. Recently there has been a semi-organized effort at applying this principle to strongly coupled conformal field theory, developing asymptotic series in inverse powers of a large quantum number as a systematic approximation scheme whose leading-order term is the familiar macroscopic limit. I will discuss this idea in the case of N=2 superconformal gauge theory in four dimensions, where it is possible to compute the large-quantum-number asymptotic series to all orders and even a hyperasymptotic series for the exponentially small corrections to it that are associated with the leading qualitative breakdown of the naive macroscopic picture. The results quite easily yield approximations accurate to 4-6 significant digits for quantum numbers of order 1, to 15 significant digits or better for quantum numbers of order 100. I will discuss the implications for one’s general picture of the large-scale structure of theory space.

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