Lower critical dimension of the symplectic symmetry class in the Anderson localisation problem: Borel-Pade re-summation of the beta-function.

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Abstract

In a previous work [1], we presented evidence that there is an Anderson transition below two dimensions in the symplectic universality class. Recently, this problem is the subject of renewed attention [2]. In a previous work [3], we have shown that the estimates of the critical exponent obtained in the non-linear sigma model formulation of the localisation problem are dramatically improved by incorporating in the Borel-Pade re-summation of the epsilon expansion for the critical exponent the asymptotic behaviour in high dimensions. In this paper [4], we will discuss the application of the Borel-Pade re-summation method directly to the beta functions of the Wigner-Dyson classes of the Anderson localisation problem. Examining the dimensionality dependence of the beta function allows us to estimate the lower critical dimension of the symplectic symmetry class.


