Anderson transition at 2D growth on antitrees

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Abstract. We consider a discrete Anderson model on a certain local mean-field type graph called an antitree. Due to a special structure the model can be treated with transfer matrices. A graph has a d dimensional growth rate if the number of edges that can be reached in n steps from a set of roots grows like n^{d-1}. Any such growth rate for any d can be realized by antitrees. We find that in a certain energy region there is a transition from localization to delocalization at exactly a 2 dimensional growth rate. In fact we have pure point spectrum for $d < 2$, pure absolutely continuous spectrum for $d > 2$ and a mix of pure point and singular continuous spectrum at $d = 2$. Surprisingly, this is supposedly the critical dimension for lattice Anderson models.

Mathematical Physics Seminar
19.01.2015, 14:15
1090 Wien, Oskar-Morgenstern-Platz 1, Seminarraum 12