The Phase Transition for Dyadic Tilings

Omer Angel, Alexander E. Holroyd, Gady Kozma, Johan Wästlund, Peter Winkler

(Submitted on 13 Jul 2011 (v1), last revised 20 Jul 2012 (this version, v3))

A dyadic tile of order n is any rectangle obtained from the unit square by n successive bisections by horizontal or vertical cuts. Let each dyadic tile of order n be available with probability p, independently of the others. We prove that for p sufficiently close to 1, there exists a set of pairwise disjoint available tiles whose union is the unit square, with probability tending to 1 as n->infinity, as conjectured by Joel Spencer in 1999. In particular we prove that if p=7/8, such a tiling exists with probability at least 1-(3/4)^n. The proof involves a surprisingly delicate counting argument for sets of unavailable tiles that prevent tiling.

Comments:	22 pages
Subjects:	**Probability (math.PR)**; Combinatorics (math.CO)
MSC classes:	05B45, 52C20, 60G18
Cite as:	**arXiv:1107.2636 [math.PR]**
	(or **arXiv:1107.2636v3 [math.PR]** for this version)

Submission history

From: Alexander E. Holroyd [view email]
[v1] Wed, 13 Jul 2011 19:27:18 GMT (19kb)
[v2] Wed, 20 Jul 2011 21:01:57 GMT (22kb)
[v3] Fri, 20 Jul 2012 22:44:09 GMT (23kb)

Which authors of this paper are endorsers?